Groundwater Remediation Systems

Quarterly Operations Report

April 1, 2019 through June 30, 2019

Brookhaven National Laboratory
Upton, Long Island, New York

Prepared by:

Brookhaven National Laboratory
Environmental Protection Division

Upton, N.Y. 11973

Prepared for:

U.S. Department of Energy
Brookhaven Site Office

October 2019

BROOKHAVEN
NATIONAL LABORATORY

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2nd Quarter Groundwater Remediation System Operations Report
April 1, 2019 through June 30, 2019
Brookhaven National Laboratory
Upton, Long Island, New York

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Section 1

System Operations Overview 2nd Quarter 2019

Table 1 – Summary of Operations						
Operable Unit System	***Type***	***Target Contaminant***	***Number of Wells***	***Years of Operation***	***Run Time For Quarter (%)***	***Pounds VOCS Removed (Quarter/Cum)***
Operable Unit I						
South Boundary	Pump and Treat (AS)	VOC	2	Operate- 16 Standby- 6	Standby	0 369
Operable Unit III						
South Boundary	Pump and Treat (AS)	VOC	8	22	95%PP	2 3,052
HFBR Pump and Recharge	Pump and Recirculate	Tritium	4	Operate- 9 Standby- 13	Closure Approved 3/19	NA 180
Industrial Park	Recirculation/ In-Well (AS/Carbon)/ Pump and Treat (Carbon)	VOC VOC	7 2	Operate- 16 Standby- 4 Operate -4	Standby 100% PP	0 1066 0.2 10
Building 96	Recirculation Well (AS/Carbon)	VOC	4	Operate- 15 Standby- 3	80%	0.2 142
Middle Road	Pump and Treat (AS)	VOC	7	17	95%	8 1277
Western South Boundary	Pump and Treat (AS)	VOC	6	17	95%	8 153
North Street	Pump and Treat (Carbon)	VOC	2	Operate – 11 Standby - 4	Standby	0 342
North Street East	Pump and Treat (Carbon)	VOC	2	Operate – 10 Standby - 5	Standby	0 44
LIPA/Airport	Pump and Treat (Carbon)	VOC	10	15	100% PP	3 462
*Industrial Park East	Pump and Treat (Carbon)	VOC	2	Operate- 5 Standby- 4	Dismantled	NA 38
Chemical Holes	Pump and Treat (IE)	Sr-90	3	Operate - 15 Standby- 1	Standby	NA
BGRR/WCF	Pump and Treat (IE)	Sr-90	9	14	100% PP	NA
Freon	Pump and Treat (AS)	Freon-11	1	Operate – 4 Standby – 3	Standby	0 106
Operable Unit VI						
EDB	Pump and Treat (Carbon)	EDB	2	15	66%	NA**

AS = air stripping
IE = ion exchange
EDB = ethylene dibromide
NA = not applicable
PP = system is pulse pumping
* Dismantlement of the Industrial Park East system was completed in 2013.
** EDB has only been detected in the influent at trace levels, just above standard, therefore no removal is reported.

Section 2

Q2-2019 Operations Summary
OU I/RA V South Boundary Pump & Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to the RA V recharge basin

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).
Note: Current Landfill monitoring well data is included in the attached data tables since this is one of the sources of the OU I/RA V plume.

Start Date: January 1997

Table 2-1
OU I South Boundary Pump & Treat System
Pumping Rates (gpm)

Extraction Well	EW-1*	EW-2*
Site ID #	115-27	115-43
Screen Interval (ft bls)	150-190	104-124/134-154
Desired Rate (GPM)	0	0
April	Off	Off
May	Off	Off
June	Off	Off
Actual (Avg. over Qtr.)	Off	Off

* The system was shut down and put in standby mode in July 2013.

Figure 2-1
OU I South Boundary Pump & Treat System
Cumulative Mass Removal VOCs vs. Time

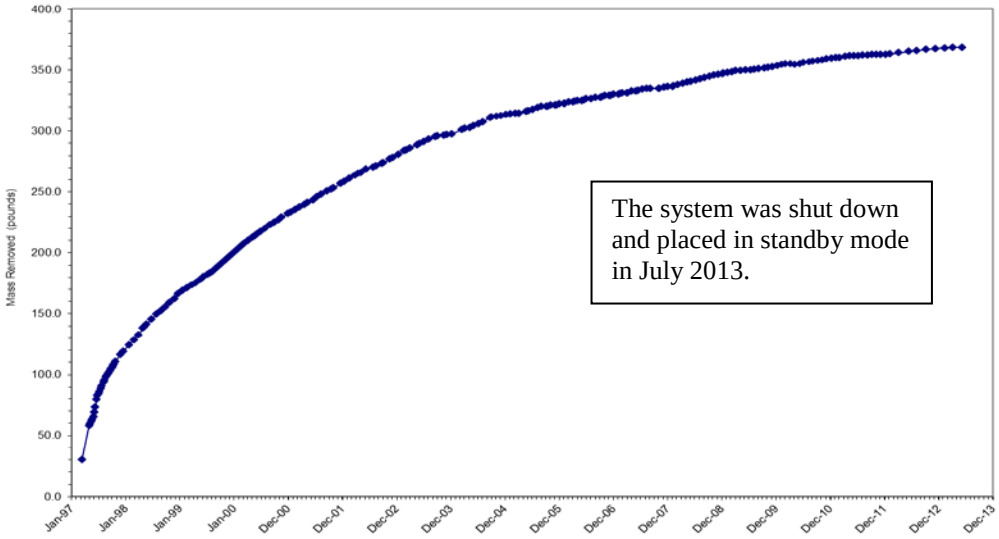


Figure 2-2
OU I South Boundary Pump & Treat System
Influent TVOC Concentrations vs. Time

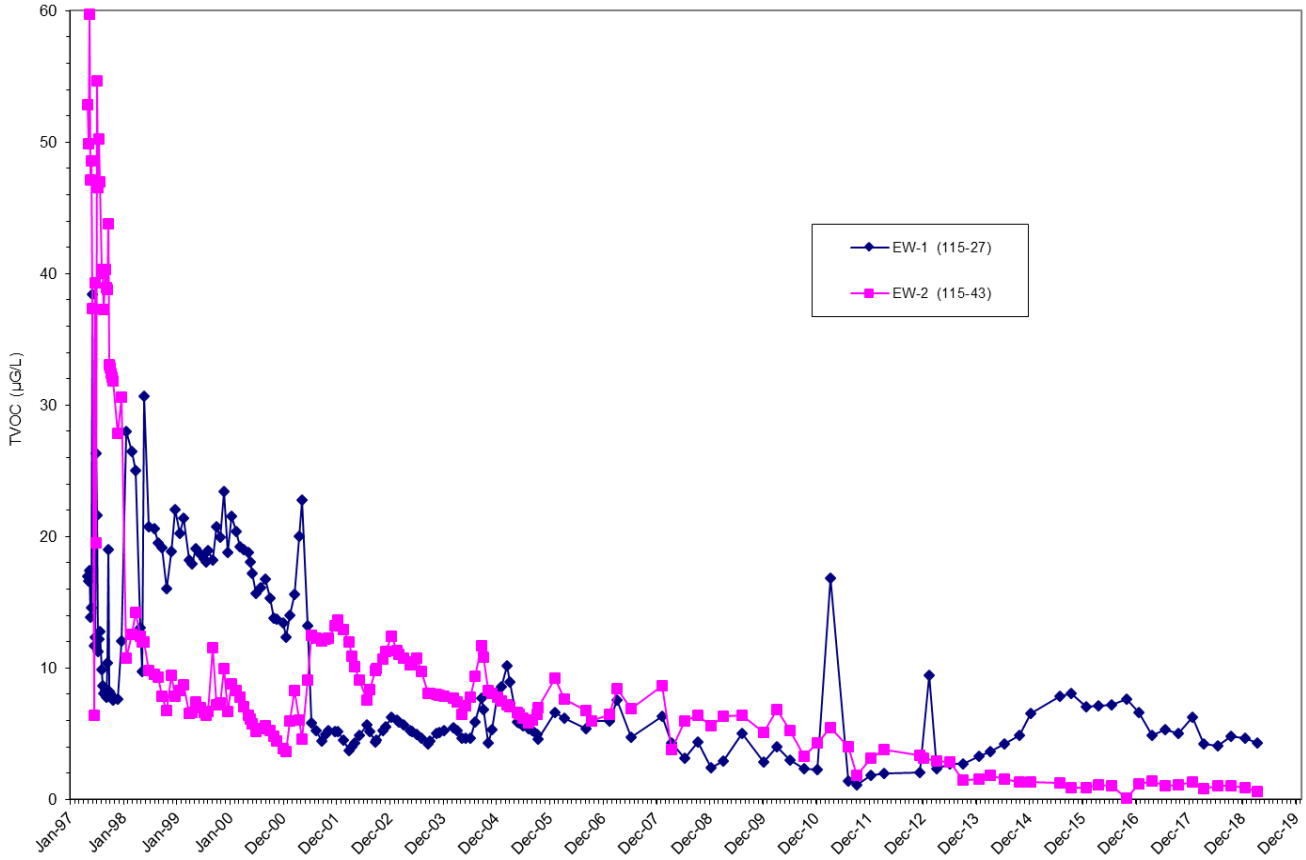


Table 2-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1 through June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	NA [1]	GPD	Continuous
pH (range)	6.0- 9.0	NA	SU	Weekly
Benzene	0.8	NA	ug/L	Month
Chloroform	7.0	NA	ug/L	Month
Chloroethane	5.0	NA	ug/L	Month
1,2-Dichloroethane	5.0	NA	ug/L	Month
1,1-Dichloroethene	5.0	NA	ug/L	Month
1,1,1-Trichloroethane	5.0	NA	ug/L	Month
Carbon Tetrachloride	5.0	NA	ug/L	Quarterly
1,2-Dichloropropane	5.0	NA	ug/L	Quarterly
Methylene Chloride	5.0	NA	ug/L	Quarterly
Trichloroethylene	5.0	NA	ug/L	Quarterly
Vinyl Chloride	2.0	NA	ug/L	Quarterly
1,2-Xylene	5.0	NA	ug/L	Quarterly
Sum of 1,3 and 1,4-Xylenes	10.0	NA	ug/L	Quarterly

[1] The system is in stand-by mode and did not treat any water this quarter.

System Operations

April 2019:

The system remained in standby mode.

May 2019:

The system remained in standby mode.

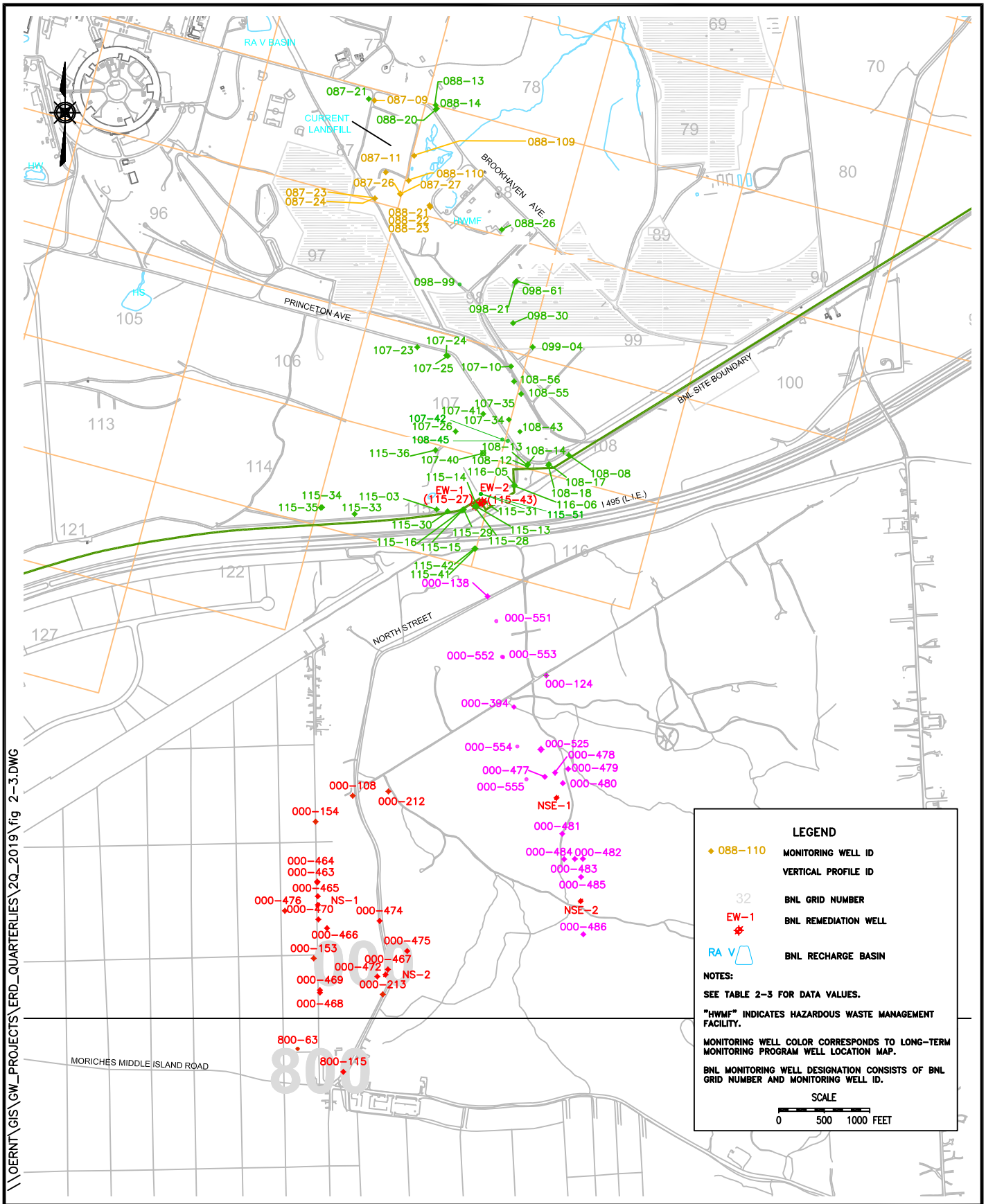
June 2019:

The system remained in standby mode.

Based on the lack of significant rebound in VOC concentrations since system shutdown in 2013 and very low remaining VOC concentrations in area monitoring wells, a Petition for Closure of the OU I South Boundary Groundwater Treatment System was submitted to the regulators in June.

Planned Operational Changes

- Maintain the system in standby mode. One or both extraction wells can be restarted if total volatile organic compound (TVOC) concentrations rebound significantly above the capture goal of 50 µg/L. The maximum TVOC concentration in a plume core monitoring well during the second quarter was 0.9 µg/L in Current Landfill well 098-99. The maximum TVOC concentration in the extraction wells was 4 µg/L in EW-1 in the second quarter.
- Install three shallow monitoring wells to provide permanent monitoring points at the locations where the highest Sr-90 concentrations were observed in and adjacent to the former source at the FHWMF.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU I SOUTH BOUNDARY/NORTH STREET/NORTH STREET EAST MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	08/08/11	NA
CHKD:	APPD:	REV.:	NOTES:
RH	--	08/22/19	–

FIGURE NO.: 2-3

Table 2-3
OU I RA V South Boundary Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 088-109

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Manganese	06/13/2019	2180	10	--	UG/L	9.31	

Site ID : 098-30

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	06/20/2019	40.5	0.674	2.25	PCI/L	37.80	

Site ID : 098-99

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	06/14/2019	0.92	1	--	UG/L	44.50	J
8260 TVOC	06/14/2019	0.92	--	--	UG/L	44.50	

Site ID : 107-35

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	06/20/2019	5.18	0.791	0.776	PCI/L	65.00	

Site ID : 115-42

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	06/11/2019	3.72	0.2	--	UG/L	168.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.
B = Result is between instrument detection limit and contract required reporting limit.

Table 2-4
OU I RA V South Boundary Monitoring Well Data - Current Landfill
"Hits Only" - April through June 2019

Site ID : 087-09

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
8260 TVOC	06/12/2019	0.47	--	--	UG/L	29.00	
Alkalinity (as CaCO3)	06/12/2019	36.6	1.45	--	MG/L	29.00	
Barium	06/12/2019	17.4	1	--	UG/L	29.00	B
Calcium	06/12/2019	6800	50	--	UG/L	29.00	
Chloroform	06/12/2019	0.47	1	--	UG/L	29.00	J
Chromium	06/12/2019	79.8	1	--	UG/L	29.00	
Iron	06/12/2019	1540	30	--	UG/L	29.00	
Magnesium	06/12/2019	3490	10	--	UG/L	29.00	E
Manganese	06/12/2019	93.1	1	--	UG/L	29.00	
Nickel	06/12/2019	4.67	1.5	--	UG/L	29.00	B
Nitrate (as N)	06/12/2019	0.138	0.033	--	MG/L	29.00	H
Nitrite + Nitrate-N	06/12/2019	0.0721	0.017	--	MG/L	29.00	
Nitrogen	06/12/2019	1.09	0.033	--	MG/L	29.00	
Potassium	06/12/2019	873	50	--	UG/L	29.00	B
Sodium	06/12/2019	18700	100	--	UG/L	29.00	
Sulfate	06/12/2019	9.75	0.133	--	MG/L	29.00	
TDS	06/12/2019	150	3.4	--	MG/L	29.00	
Total Kjeldahl Nitrogen	06/12/2019	1.02	0.033	--	MG/L	29.00	
TSS	06/12/2019	4.2	0.57	--	MG/L	29.00	
Vanadium	06/12/2019	1.17	1	--	UG/L	29.00	B
Zinc	06/12/2019	7.56	3.3	--	UG/L	29.00	B

Site ID : 087-11

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Manganese	06/13/2019	1940	10	--	UG/L	16.00	

Site ID : 087-23

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Manganese	06/13/2019	2430	10	--	UG/L	32.50	

Site ID : 087-24

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Alkalinity (as CaCO3)	06/13/2019	26.8	1.45	--	MG/L	75.00	
Barium	06/13/2019	15.4	1	--	UG/L	75.00	B
Calcium	06/13/2019	6640	50	--	UG/L	75.00	
Copper	06/13/2019	0.566	0.3	--	UG/L	75.00	BN
Magnesium	06/13/2019	4800	10	--	UG/L	75.00	E
Nitrate (as N)	06/13/2019	0.589	0.033	--	MG/L	75.00	H
Nitrite + Nitrate-N	06/13/2019	0.617	0.017	--	MG/L	75.00	
Nitrogen	06/13/2019	0.657	0.033	--	MG/L	75.00	
Potassium	06/13/2019	1510	50	--	UG/L	75.00	B
Sodium	06/13/2019	30800	100	--	UG/L	75.00	
Sulfate	06/13/2019	16.2	0.133	--	MG/L	75.00	
TDS	06/13/2019	177	3.4	--	MG/L	75.00	
TSS	06/13/2019	0.722	0.588	--	MG/L	75.00	J
Zinc	06/13/2019	5.95	3.3	--	UG/L	75.00	B

Table 2-4
OU I RA V South Boundary Monitoring Well Data - Current Landfill
"Hits Only" - April through June 2019

Site ID : 087-26

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
8260 TVOC	06/12/2019	0	--	--	UG/L	75.00	
Alkalinity (as CaCO3)	06/12/2019	22.9	1.45	--	MG/L	75.00	
Barium	06/12/2019	18.8	1	--	UG/L	75.00	B
Calcium	06/12/2019	4220	50	--	UG/L	75.00	B
Iron	06/12/2019	120	30	--	UG/L	75.00	
Magnesium	06/12/2019	3230	10	--	UG/L	75.00	E
Manganese	06/12/2019	2.85	1	--	UG/L	75.00	B
Nitrate (as N)	06/12/2019	0.476	0.033	--	MG/L	75.00	H
Nitrite + Nitrate-N	06/12/2019	0.472	0.017	--	MG/L	75.00	
Nitrogen	06/12/2019	0.903	0.033	--	MG/L	75.00	
Potassium	06/12/2019	1320	50	--	UG/L	75.00	B
Sodium	06/12/2019	16200	100	--	UG/L	75.00	
Sulfate	06/12/2019	12.5	0.133	--	MG/L	75.00	
TDS	06/12/2019	82.9	3.4	--	MG/L	75.00	
Total Kjeldahl Nitrogen	06/12/2019	0.431	0.033	--	MG/L	75.00	
TSS	06/12/2019	0.7	0.57	--	MG/L	75.00	J
Zinc	06/12/2019	5.65	3.3	--	UG/L	75.00	B

Site ID : 087-27

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Manganese	06/12/2019	1140	10	--	UG/L	12.50	

Site ID : 088-109

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Manganese	06/13/2019	2180	10	--	UG/L	9.31	

Site ID : 088-110

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Manganese	06/13/2019	3100	10	--	UG/L	17.50	

Site ID : 088-21

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
8260 TVOC	06/14/2019	0	--	--	UG/L	12.50	
Alkalinity (as CaCO3)	06/14/2019	31.2	1.45	--	MG/L	12.50	
Barium	06/14/2019	6.6	1	--	UG/L	12.50	B
Calcium	06/14/2019	10200	50	--	UG/L	12.50	
Copper	06/14/2019	0.887	0.3	--	UG/L	12.50	BN
Iron	06/14/2019	2410	30	--	UG/L	12.50	
Magnesium	06/14/2019	5630	10	--	UG/L	12.50	E
Manganese	06/14/2019	107	1	--	UG/L	12.50	
Nitrate (as N)	06/14/2019	0.0735	0.033	--	MG/L	12.50	J
Potassium	06/14/2019	671	50	--	UG/L	12.50	B
Sodium	06/14/2019	47600	100	--	UG/L	12.50	
Sulfate	06/14/2019	1.75	0.133	--	MG/L	12.50	
TDS	06/14/2019	224	3.4	--	MG/L	12.50	
TSS	06/14/2019	5.1	0.57	--	MG/L	12.50	
Vanadium	06/14/2019	2.35	1	--	UG/L	12.50	B
Zinc	06/14/2019	4.93	3.3	--	UG/L	12.50	B

Table 2-4
OU I RA V South Boundary Monitoring Well Data - Current Landfill
"Hits Only" - April through June 2019

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.
B = Result is between instrument detection limit and contract required reporting limit.

Table 2-5
OU I RA V South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 115-27 (EW-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	04/03/2019	2.3	0.5	--	UG/L	0.00	
524.2 TVOC	04/03/2019	4.3	--	--	UG/L	0.00	
Chloroethane	04/03/2019	2	0.5	--	UG/L	0.00	

Site ID : 115-43 (EW-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0.64	--	--	UG/L	0.00	
Chloroform	04/03/2019	0.64	0.5	--	UG/L	0.00	

Section 3

Q2-2019 Operations Summary
OU III South Boundary Pump and Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to both the OU III and RA V recharge basins.

Goal: Reach MCLs in core monitoring wells in OU III within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: June 1997

Table 3-1
OU III South Boundary
Pumping Rates (gpm)

Extraction Well	EW-3	EW-4	EW-5	EW-6	EW-7	EW-8	EW-12	EW-17
Site ID	121-17	121-16	121-15	122-14	122-13	122-12	122-30	121-46
Screen Interval (ft bls)	150-190	160-180 &190-200	160-200	160-200	170-210	190-210 & 230-250	180-220	207-237
Desired Flow Rate (gpm)	0*	140	0*	0*	0*	0*	0*	150
April	0	34	0	0	0	0	0	150
May	0	126	0	0	0	0	0	122
June	0	0	0	0	0	0	0	35
Actual (Avg. over Qtr)	**0**	**126**	**0**	**0**	**0**	**0**	**0**	**102**

* Extraction wells placed in standby mode: EW-12 (2003), EW-8 (2006), EW-6 (2007), EW-7 (2007), EW-3 and EW-5 (2015).

Figure 3-1
OU III South Boundary
Cumulative Mass Removal of VOC's vs. Time

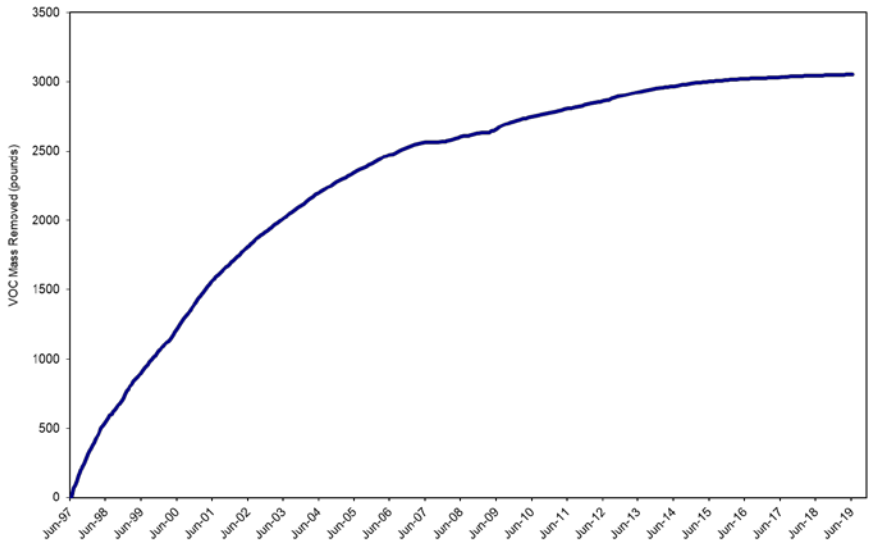


Figure 3-2
OU III South Boundary
Influent TVOC Concentration vs. Time

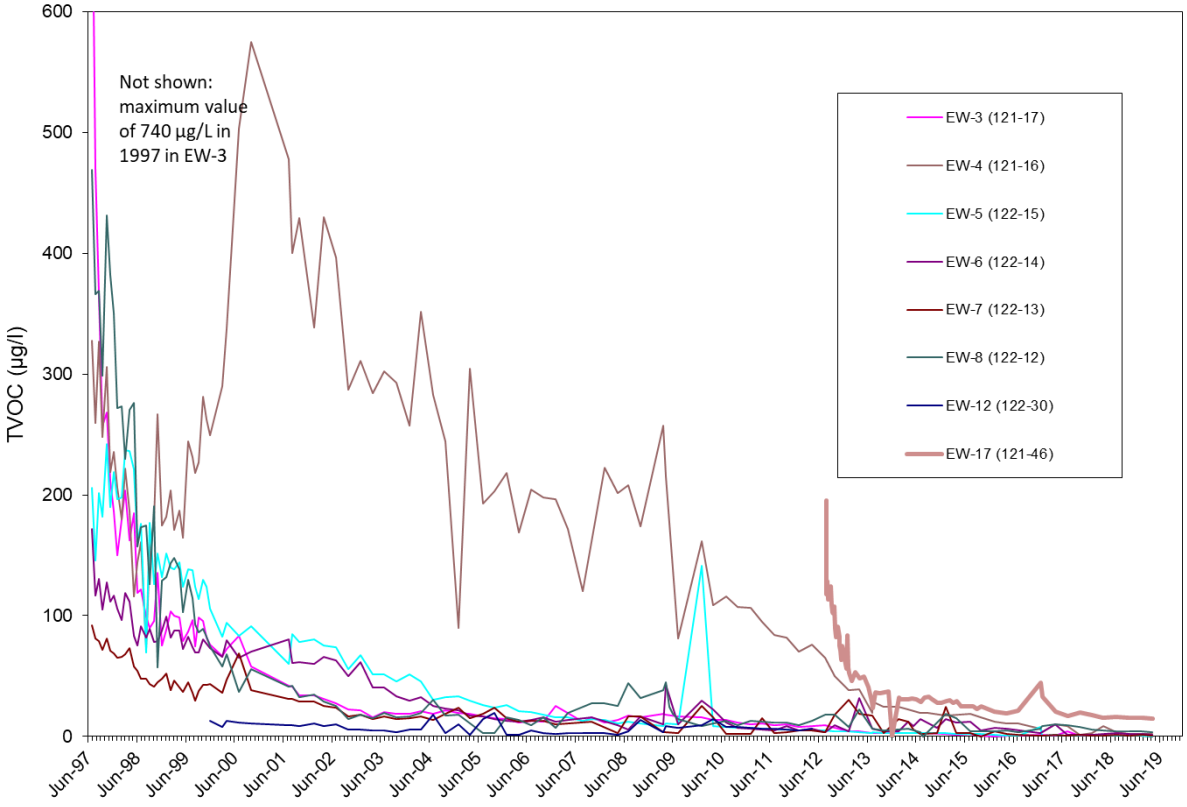


Table 3-2
OU III South Boundary Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**863,359[1]**	**GPD**	**Continuous**
pH (range)	**6.5 - 8.5**	**6.9– 7.4[2]**	**SU**	**Monthly[3]**
Carbon Tetrachloride	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Chloroform	**7**	**<0.50**	**ug/L**	**Monthly[3]**
Dichlorodifluoromethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1-Dichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1-Dichloroethylene	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Methyl Chloride	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Tetrachloroethylene	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Toluene	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1,1-Trichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
1,1,2 Trichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[3]**
Trichloroethylene	**10**	**<0.50**	**ug/L**	**Monthly[3]**

[1] = The maximum monthly average flow rate for both the OUIII South Boundary and Middle Road Systems, during the operational period.
[2] = The minimum and maximum pH values during the operational period.
[3] = Beginning in April 2003, a SPDES modification was approved revising the pH and volatile organic sampling to once a month.

System Operations

April 2019:

The system operated normally for the month. EW-4 was off for pulsed pumping three of the four weeks. EW-17 was in full time operation. Wells EW-3, EW-5, EW-6, EW-7, EW-8 and EW-12 remained in standby mode. The system treated approximately 8 million gallons of water.

May 2019:

The system operated normally for the month. Extraction well EW-4 and EW-17 were in full time operation. Wells EW-3, EW-5, EW-6, EW-7, EW-8 and EW-12 remained in standby mode. The system treated approximately 10.5 million gallons of water.

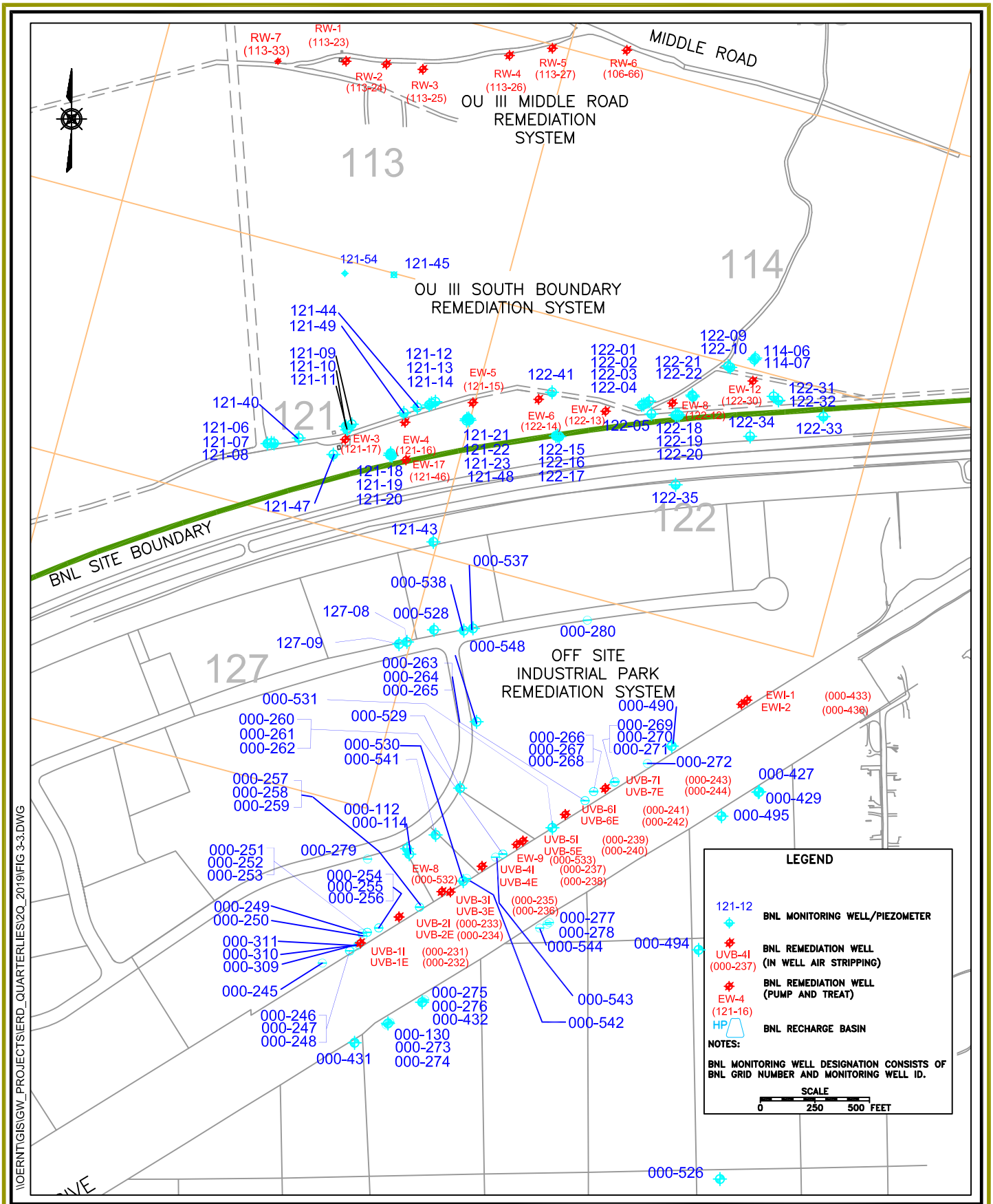
June 2019:

The system operated normally for the month. EW-4 was off for pulsed pumping. EW-17 was off for 3 weeks for pump and motor maintenance. Wells EW-3, EW-5, EW-6, EW-7, EW-8 and EW-12 remained in standby mode. The system treated approximately 1.5 million gallons of water.

The system treated approximately 20 million gallons of water during the second quarter of 2019.

Planned Operational Changes

- Maintain wells EW-3, EW-5, EW-6, EW-7, EW-8, and EW-12 in standby mode. The system's extraction wells will continue to be sampled on a quarterly basis, except for EW-12 which is no longer sampled. The wells will be restarted if extraction or monitoring well data indicate TVOC concentrations exceed the 50 µg/L capture goal. During the second quarter, TVOC concentrations in extraction wells EW-3, EW-5, EW-6, EW-7, and EW-8 and adjacent monitoring wells were less than 50 µg/L.
- Continue to operate well EW-17 on a full-time basis. Continue pulsed pumping well EW-4 one month on and one month off. During the second quarter, TVOC concentrations in extraction wells EW-4 and EW-17 were less than 50 µg/L. TVOC concentrations in monitoring well 121-49, located upgradient of and at the same depth as EW-17, remains significantly above 50 µg/L in the second quarter.



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ENVIRONMENTAL PROTECTION DIVISION

TITLE: OU III SOUTH BOUNDARY/INDUSTRIAL PARK/INDUSTRIAL PARK EAST MONITORING WELL NETWORKS

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
JEB	–	09/12/14	–
CHKD:	APPD:	REV.:	NOTES:
RH	–	09/03/19	–

FIGURE NO.: 3–3

Table 3-3
OU III South Boundary Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 121-43

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/03/2019	0.72	--	--	UG/L	195.00	
Tetrachloroethylene	05/03/2019	0.72	0.5	--	UG/L	195.00	

Site ID : 121-45

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/19/2019	8.5	--	--	UG/L	199.50	
Tetrachloroethylene	04/19/2019	8.5	0.5	--	UG/L	199.50	

Site ID : 121-49

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Carbon tetrachloride	04/25/2019	39	5	--	UG/L	215.00	
Tetrachloroethylene	04/25/2019	220	5	--	UG/L	215.00	

Table 3-4
OU III South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 121-15 (EW-5)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	0	--	--	UG/L	0.00	

Site ID : 121-16 (EW-4)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	1.8	--	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	1.8	0.5	--	UG/L	0.00	

Site ID : 121-17 (EW-3)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	1.3	--	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	1.3	0.5	--	UG/L	0.00	

Site ID : 121-46 (EW-17)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/11/2019	0.5	0.5	--	UG/L	0.00	
524.2 TVOC	04/11/2019	14.48	--	--	UG/L	0.00	
Carbon tetrachloride	04/11/2019	1.8	0.5	--	UG/L	0.00	
Chloroform	04/11/2019	0.68	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	11	0.5	--	UG/L	0.00	
Trichloroethylene	04/11/2019	0.5	0.5	--	UG/L	0.00	

Site ID : 122-12 (EW-8)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	3.3	--	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	3.3	0.5	--	UG/L	0.00	

Site ID : 122-13 (EW-7)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	0.7	--	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	0.7	0.5	--	UG/L	0.00	

Site ID : 122-14 (EW-6)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	1.25	--	--	UG/L	0.00	
Chloroform	04/11/2019	0.53	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	0.72	0.5	--	UG/L	0.00	

Table 3-5
OU III South Boundary Influent Data
"Hits Only" - April through June 2019

Site ID : 121-41 (System Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	3.3	--	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	3.3	0.5	--	UG/L	0.00	
524.2 TVOC	05/03/2019	8.9	--	--	UG/L	0.00	
Carbon tetrachloride	05/03/2019	1.1	0.5	--	UG/L	0.00	
Tetrachloroethylene	05/03/2019	7.8	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/11/2019	0.53	0.5	--	UG/L	0.00	
524.2 TVOC	06/11/2019	12.8	--	--	UG/L	0.00	
Carbon tetrachloride	06/11/2019	2	0.5	--	UG/L	0.00	
Chloroform	06/11/2019	0.67	0.5	--	UG/L	0.00	
Tetrachloroethylene	06/11/2019	9.6	0.5	--	UG/L	0.00	

Table 3-6
OU III South Boundary Effluent Data
"Hits Only" - April through June 2019

Site ID : 095-126 (System Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/01/2019	0	--	--	UG/L	0.00	
Perfluorobutanesulfonate (PFBS)	04/01/2019	1.49	1.54	--	NG/L	0.00	J
Perfluorobutyric acid (PFBA)	04/01/2019	6.95	1.73	--	NG/L	0.00	
Perfluoroheptanoic acid (PFHpA)	04/01/2019	0.745	1.73	--	NG/L	0.00	J
Perfluorohexanesulfonate (PFHxS)	04/01/2019	16.8	1.58	--	NG/L	0.00	
Perfluorohexanoic acid (PFHxA)	04/01/2019	3.34	1.73	--	NG/L	0.00	
Perfluorooctanesulfonate (PFOS)	04/01/2019	7.57	1.73	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	04/01/2019	4.11	1.73	--	NG/L	0.00	
Perfluoropentanesulfonate (PFPeS)	04/01/2019	1.5	1.63	--	NG/L	0.00	J
Perfluoropentanoic acid (PFPeA)	04/01/2019	0.968	1.73	--	NG/L	0.00	J
524.2 TVOC	04/09/2019	0	--	--	UG/L	0.00	
524.2 TVOC	04/16/2019	0	--	--	UG/L	0.00	
524.2 TVOC	04/23/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/01/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/14/2019	0	--	--	UG/L	0.00	
524.2 TVOC	06/06/2019	0	--	--	UG/L	0.00	
524.2 TVOC	06/19/2019	0	--	--	UG/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Section 4

Q2-2019 Operations Summary
OU III Middle Road Pump and Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to both the OU III and RAV recharge basins.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells in OU III within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: October 23, 2001

Table 4-1
OU III Middle Road
Pumping Rates (gpm)

Extraction Well	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6	RW-7
Site Id #	113-23	113-24	113-25	113-26	113-27	106-66	113-33
Screen Interval (ft bls)	90-130	170-200	228-268	150-180	150-180	188-218	202-222
Desired Flow Rate (gpm)	0*	150	100	0*	0*	0*	100
April (Avg monthly gpm)	0	100	117	0	0	0	144
May " " "	0	101	113	0	0	0	137
June " " "	0	107	114	0	0	0	160
Actual (Avg. over Qtr.)	**0**	**103**	**115**	**0**	**0**	**0**	**147**

* Extraction wells placed in standby mode: RW-4 and RW-5 (2003), RW-6 (2006), and RW-1 (2015).

Figure 4-1
OU III Middle Road
Cumulative Mass Removal of VOC's vs. Time

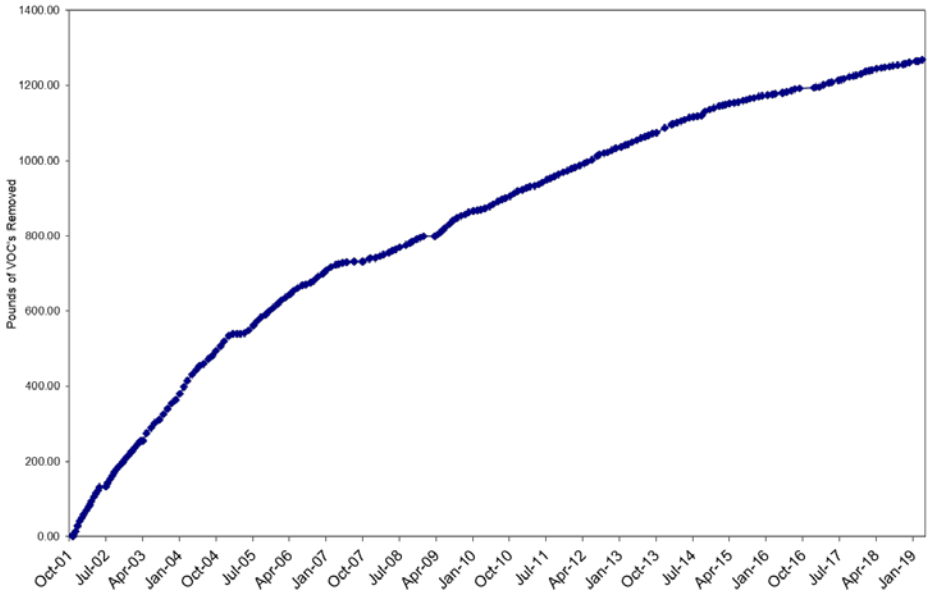


Figure 4-2
OU III Middle Road
Influent TVOC Concentrations vs. Time

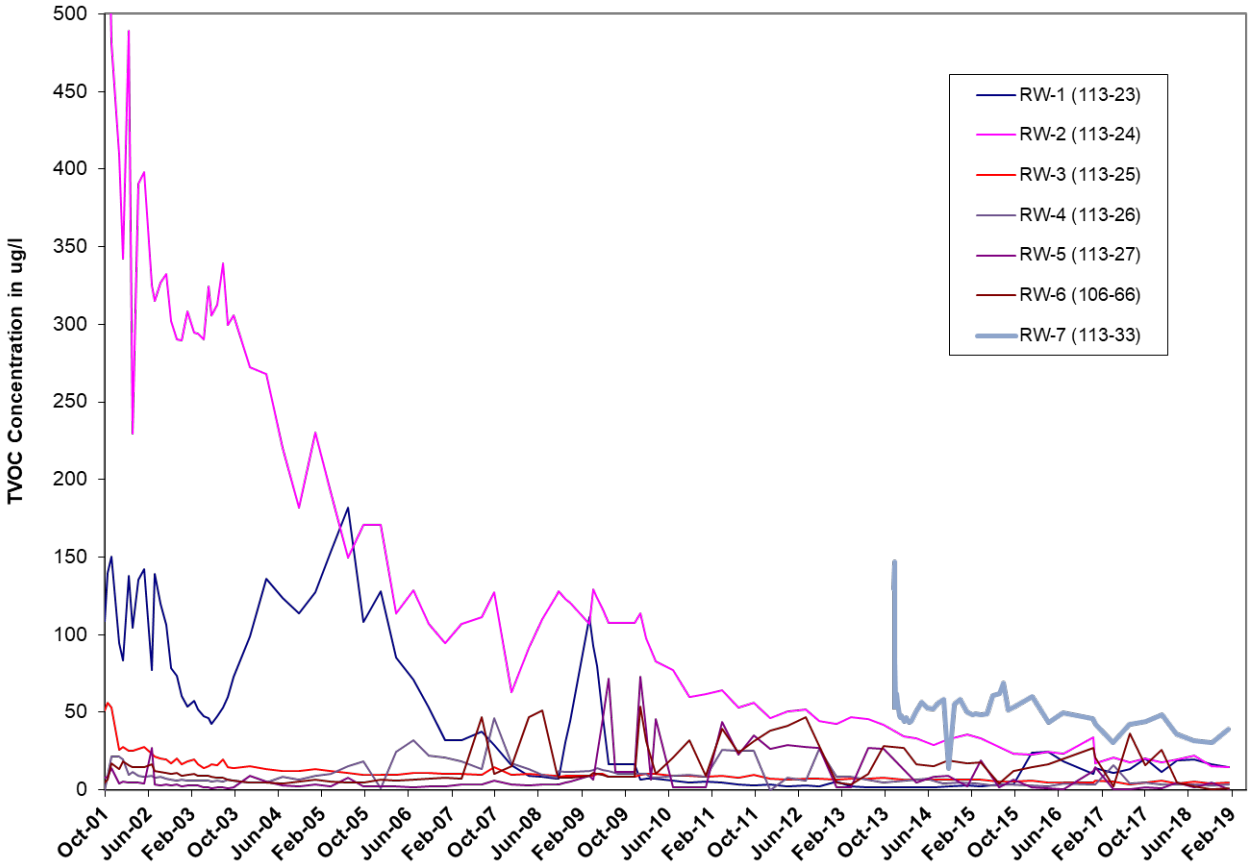


Table 4-2
OU III Middle Road Air-Stripping Tower Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1, 2019 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**863,359** [1]	**GPD**	**Continuous**
pH (range)	**6.5 - 8.5**	**6.9-7.4** [2]	**SU**	**Monthly**[3]
Carbon Tetrachloride	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Chloroform	**7**	**<0.05**	**ug/L**	**Monthly**[3]
Dichlorodifluorometha	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1-Dichloroethane	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1-Dichloroethylene	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Methyl Chloride	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Tetrachloroethylene	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Toluene	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1,1-Trichloroethane	**5**	**<0.05**	**ug/L**	**Monthly**[3]
1,1,2 Trichloroethane	**5**	**<0.05**	**ug/L**	**Monthly**[3]
Trichloroethylene	**10**	**<0.05**	**ug/L**	**Monthly**[3]

[1] The maximum monthly average flow for the Middle Road and South Boundary Systems during the operational period.
[2] The minimum and maximum pH values for the Middle Road Effluent, during the operational period.
[3] Beginning in April 2003, a SPDES modification was approved revising the pH and volatile organic sampling to once a month.

System Operations

April 2019:

Extraction wells RW-2, RW-3, and RW-7 were in full time operation. Wells RW-1, RW-4, RW-5 and RW-6 remained in standby mode. The effluent sample was taken from the South Boundary tower effluent sample port since only one air stripper is currently in operation. The system treated approximately 15.5 million gallons of water.

May 2019:

The system operated normally for the month. RW-2, RW-3, and RW-7 were in full time operation. Wells RW-1, RW-4, RW-5 and RW-6 remained in standby mode. The effluent sample was taken from the Middle Road and South Boundary tower effluent sample ports as they were operating at the same time. The system treated approximately 15 million gallons of water.

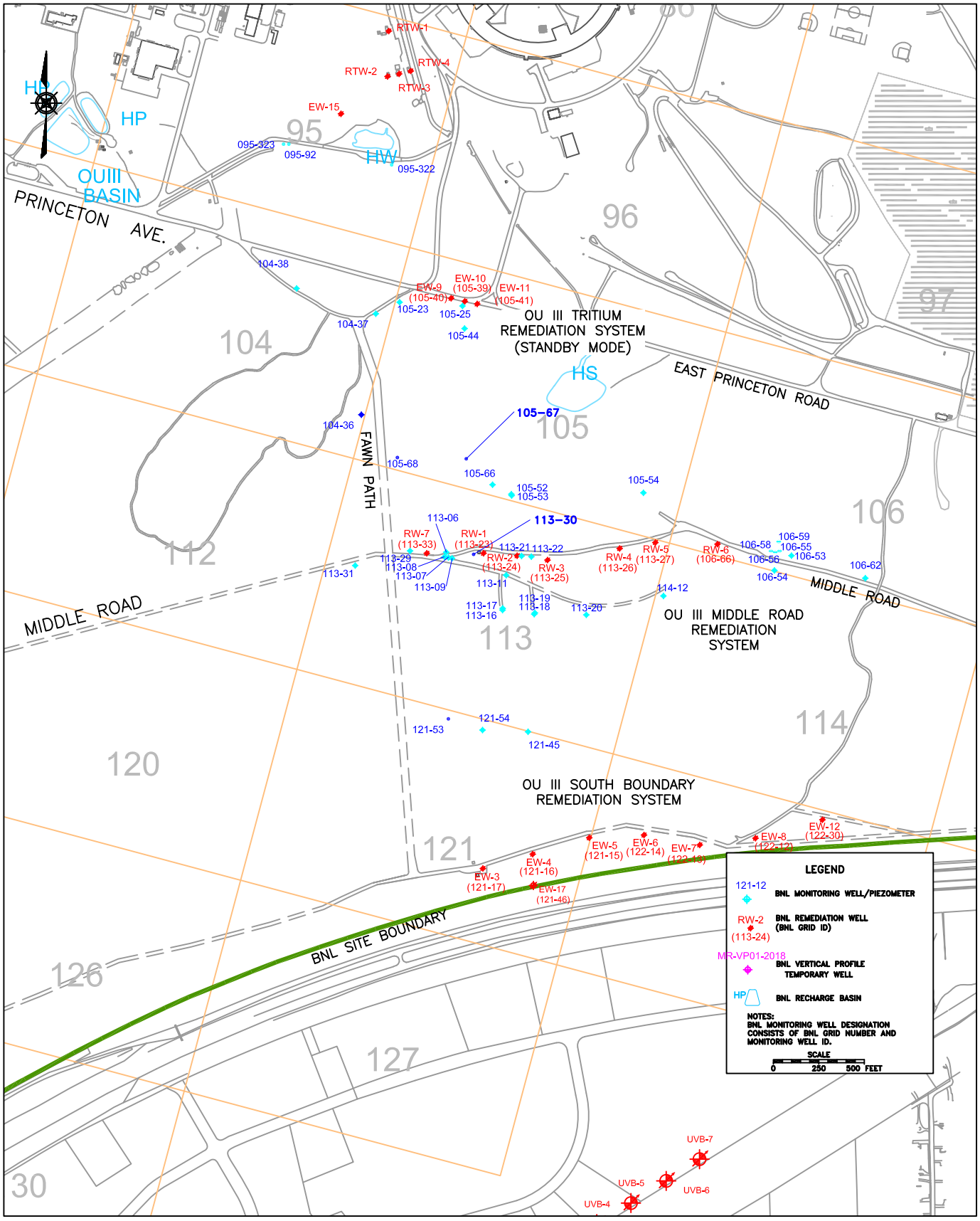
June 2019:

Extraction wells RW-2, RW-3, and RW-7 were in full time operation. Wells RW-1, RW- 4, RW-5 and RW-6 remained in standby mode. The effluent sample was taken from the South Boundary tower effluent sample port. The system treated approximately 16.5 million gallons of water.

The system treated approximately 47 million gallons of water during the second quarter of 2019.

Planned Operational Changes

- Continue operation of extraction wells RW-2, RW-3 and RW-7, and maintain RW-1, RW-4, RW-5 and RW-6 in standby mode. Restart the well(s) if extraction or monitoring well data indicate that TVOC concentrations exceed the 50 µg/L capture goal. TVOC concentrations in extraction wells RW-1, RW-4, RW-5 and RW-6 and adjacent monitoring wells were below 50 µg/L in the second quarter.



\\OERNT\GIS\GW_PROJECTS\ERD_QUARTERLIES\1Q_2019\FIG 4-3.DWG

ENVIRONMENTAL
PROTECTION DIVISION

TITLE:

OU III MIDDLE ROAD MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
JEB	–	02/08/07	–
CHKD:	APPD:	REV.:	NOTES:
RH	––	10/1/19	–

FIGURE NO.: 4–3

Table 4-3
OU III Middle Road Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 095-322

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/23/2019	3.5	0.5	--	UG/L	180.00	
1,1-Dichloroethane	04/23/2019	0.66	0.5	--	UG/L	180.00	
1,1-Dichloroethylene	04/23/2019	4.4	0.5	--	UG/L	180.00	
524.2 TVOC	04/23/2019	34.05	--	--	UG/L	180.00	
Chloroform	04/23/2019	0.59	0.5	--	UG/L	180.00	
Tetrachloroethylene	04/23/2019	17	0.5	--	UG/L	180.00	
Trichloroethylene	04/23/2019	7.9	0.5	--	UG/L	180.00	

Site ID : 095-323

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/22/2019	2.5	0.5	--	UG/L	205.00	
1,1,2,2-Tetrachloroethane	04/22/2019	1.5	0.5	--	UG/L	205.00	
1,1-Dichloroethylene	04/22/2019	1.6	0.5	--	UG/L	205.00	
524.2 TVOC	04/22/2019	21.2	--	--	UG/L	205.00	
Tetrachloroethylene	04/22/2019	11	0.5	--	UG/L	205.00	
Trichloroethylene	04/22/2019	4.6	0.5	--	UG/L	205.00	

Site ID : 095-92

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/22/2019	0.53	--	--	UG/L	121.00	
Chloroform	04/22/2019	0.53	0.5	--	UG/L	121.00	

Site ID : 104-37

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/22/2019	84	5	--	UG/L	209.00	

Site ID : 105-23

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/18/2019	0.61	0.5	--	UG/L	180.00	
1,1-Dichloroethylene	04/18/2019	0.69	0.5	--	UG/L	180.00	
524.2 TVOC	04/18/2019	16.3	--	--	UG/L	180.00	
Tetrachloroethylene	04/18/2019	15	0.5	--	UG/L	180.00	

Site ID : 105-25

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/22/2019	0	--	--	UG/L	147.50	

Site ID : 105-44

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,2,3-Trichlorobenzene	04/22/2019	0.68	0.5	--	UG/L	152.50	
524.2 TVOC	04/22/2019	2.08	--	--	UG/L	152.50	
Tetrachloroethylene	04/22/2019	1.4	0.5	--	UG/L	152.50	

Site ID : 105-53

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/24/2019	0.81	--	--	UG/L	175.00	
Tetrachloroethylene	04/24/2019	0.81	0.5	--	UG/L	175.00	

Table 4-3
OU III Middle Road Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 105-66

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/22/2019	200	13	--	UG/L	184.00	

Site ID : 105-67

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/22/2019	68	5	--	UG/L	185.00	

Site ID : 105-68

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/18/2019	260	13	--	UG/L	205.00	

Site ID : 106-56

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/25/2019	0	--	--	UG/L	165.00	

Site ID : 106-58

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/25/2019	0.93	--	--	UG/L	205.00	
Tetrachloroethylene	04/25/2019	0.93	0.5	--	UG/L	205.00	

Site ID : 106-62

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/25/2019	0.66	--	--	UG/L	72.00	
Chloroform	04/25/2019	0.66	0.5	--	UG/L	72.00	
Strontium-90	04/25/2019	0.558	0.234	0.182	PCI/L	72.00	

Site ID : 113-08

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/18/2019	0.64	--	--	UG/L	142.00	
Chloroform	04/18/2019	0.64	0.5	--	UG/L	142.00	

Site ID : 113-09

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/19/2019	58	2.5	--	UG/L	222.00	

Site ID : 113-11

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/22/2019	2.5	--	--	UG/L	201.00	
Tetrachloroethylene	04/22/2019	2.5	0.5	--	UG/L	201.00	

Site ID : 113-17

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/19/2019	18	--	--	UG/L	177.00	
Tetrachloroethylene	04/19/2019	18	0.5	--	UG/L	177.00	

Table 4-3
OU III Middle Road Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 113-19

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/19/2019	12	0.5	--	UG/L	230.00	
1,1-Dichloroethane	04/19/2019	0.74	0.5	--	UG/L	230.00	
1,1-Dichloroethylene	04/19/2019	6.7	0.5	--	UG/L	230.00	
524.2 TVOC	04/19/2019	33.24	--	--	UG/L	230.00	
Carbon tetrachloride	04/19/2019	7.4	0.5	--	UG/L	230.00	
Chloroform	04/19/2019	1.1	0.5	--	UG/L	230.00	
cis-1,2-Dichloroethylene	04/19/2019	0.5	0.5	--	UG/L	230.00	
Trichloroethylene	04/19/2019	4.8	0.5	--	UG/L	230.00	

Site ID : 113-22

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/24/2019	6.97	--	--	UG/L	240.00	
Carbon tetrachloride	04/24/2019	6.4	0.5	--	UG/L	240.00	
Chloroform	04/24/2019	0.57	0.5	--	UG/L	240.00	

Site ID : 113-30

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/22/2019	24.1	--	--	UG/L	190.00	
Carbon tetrachloride	04/22/2019	10	0.5	--	UG/L	190.00	
Chloroform	04/22/2019	2.1	0.5	--	UG/L	190.00	
Tetrachloroethylene	04/22/2019	12	0.5	--	UG/L	190.00	

Site ID : 113-31

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/18/2019	1.4	0.5	--	UG/L	190.00	
1,1-Dichloroethylene	04/18/2019	0.58	0.5	--	UG/L	190.00	
524.2 TVOC	04/18/2019	1.98	--	--	UG/L	190.00	

Site ID : 114-12

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/24/2019	0.55	--	--	UG/L	155.00	
Chloroform	04/24/2019	0.55	0.5	--	UG/L	155.00	

Site ID : 121-45

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/19/2019	8.5	--	--	UG/L	199.50	
Tetrachloroethylene	04/19/2019	8.5	0.5	--	UG/L	199.50	

Site ID : 121-53

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/25/2019	62	5	--	UG/L	229.00	

Table 4-4
OU III Middle Road Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 106-66 (RW-6)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	1.4	--	--	UG/L	0.00	
Dichlorodifluoromethane	04/11/2019	0.62	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	0.78	0.5	--	UG/L	0.00	

Site ID : 113-23 (RW-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	13.43	--	--	UG/L	0.00	
Carbon tetrachloride	04/11/2019	0.86	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	12	0.5	--	UG/L	0.00	
Trichloroethylene	04/11/2019	0.57	0.5	--	UG/L	0.00	

Site ID : 113-24 (RW-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	13.41	--	--	UG/L	0.00	
Carbon tetrachloride	04/11/2019	0.84	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	12	0.5	--	UG/L	0.00	
Trichloroethylene	04/11/2019	0.57	0.5	--	UG/L	0.00	

Site ID : 113-25 (RW-3)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/11/2019	2	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/11/2019	0.72	0.5	--	UG/L	0.00	
524.2 TVOC	04/11/2019	3.72	--	--	UG/L	0.00	
Trichloroethylene	04/11/2019	1	0.5	--	UG/L	0.00	

Site ID : 113-26 (RW-4)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	3.4	--	--	UG/L	0.00	
Carbon tetrachloride	04/11/2019	1	0.5	--	UG/L	0.00	
Chloroform	04/11/2019	1	0.5	--	UG/L	0.00	
Trichloroethylene	04/11/2019	1.4	0.5	--	UG/L	0.00	

Site ID : 113-27 (RW-5)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/11/2019	0	--	--	UG/L	0.00	

Site ID : 113-33 (RW-7)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/11/2019	1.4	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/11/2019	0.82	0.5	--	UG/L	0.00	
524.2 TVOC	04/11/2019	44.61	--	--	UG/L	0.00	
Carbon tetrachloride	04/11/2019	2.7	0.5	--	UG/L	0.00	
Chloroform	04/11/2019	0.59	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	38	0.5	--	UG/L	0.00	
Trichloroethylene	04/11/2019	1.1	0.5	--	UG/L	0.00	

Table 4-5
OU III Middle Road Influent Data
"Hits Only" - April through June 2019

Site ID : 113-34 (Combo Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/11/2019	1	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/11/2019	0.54	0.5	--	UG/L	0.00	
524.2 TVOC	04/11/2019	23.74	--	--	UG/L	0.00	
Carbon tetrachloride	04/11/2019	1.3	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/11/2019	20	0.5	--	UG/L	0.00	
Trichloroethylene	04/11/2019	0.9	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/03/2019	0.92	0.5	--	UG/L	0.00	
524.2 TVOC	05/03/2019	20.91	--	--	UG/L	0.00	
Carbon tetrachloride	05/03/2019	1.2	0.5	--	UG/L	0.00	
Tetrachloroethylene	05/03/2019	18	0.5	--	UG/L	0.00	
Trichloroethylene	05/03/2019	0.79	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/11/2019	1.1	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	06/11/2019	0.52	0.5	--	UG/L	0.00	
524.2 TVOC	06/11/2019	20.66	--	--	UG/L	0.00	
Carbon tetrachloride	06/11/2019	1.3	0.5	--	UG/L	0.00	
Tetrachloroethylene	06/11/2019	17	0.5	--	UG/L	0.00	
Trichloroethylene	06/11/2019	0.74	0.5	--	UG/L	0.00	

Table 4-6
OU III Middle Road Effluent Data
"Hits Only" - April through June 2019

Site ID : 095-270 (System Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/01/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/14/2019	0	--	--	UG/L	0.00	

Section 5

Q2-2019 Operations Summary
OU III Industrial Park In-Well Air Stripping System

Process: Groundwater extraction and in-well air stripping treatment, with discharge in same well (recirculating well technology) for wells UVB-1 through UVB-7, and groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells for wells EW-8 and EW-9.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030), and 65 years for the Magothy aquifer (by 2065).

Start Date: September 1999

Table 5-1
OU III Industrial Park
Pumping Rates (gpm)

Recirculation Treatment Well	**UVB-1**	**UVB-2**	**UVB-3**	**UVB-4**	**UVB-5**	**UVB-6**	**UVB-7**	**EW-8**	**EW-9**
Site Id #	000-231	000-233	000-235	000-237	000-239	000-241	000-243	000-532	000-533
Screened Interval (feet below grade)	220-240	195-215	194-214	170-190	180-200	190-210	205-225	230-250	220-240
Desired Flow Rate (GPM)	*0	*0	*0	*0	*0	*0	*0	100	100
April	*0	*0	*0	*0	*0	*0	*0	**0	**0
May	*0	*0	*0	*0	*0	*0	*0	135	130
June	*0	*0	*0	*0	*0	*0	*0	**0	**0
Actual (Avg.over Qtr.)	*0	*0	*0	*0	*0	*0	*0	**45**	**43**

Note: UVB-1, UVB-7 and UVB-2 were placed in standby mode in 2005, 2009, and 2010 respectively. The system was shut down and placed in stand-by mode in 2013. In March 2014, wells UVB-3 through UVB-6 were restarted due to elevated VOCs.
*Wells UVB-1 to UVB-7 were placed in stand-by mode February 2017.
Wells EW-8 and EW-9 started full-time operation January 2015.
**Wells EW-8 and EW-9 started one month on and one month off pulsed pumping February 2018.

Figure 5-1
OU III Industrial Park
Cumulative Mass Removal of VOCs vs. Time

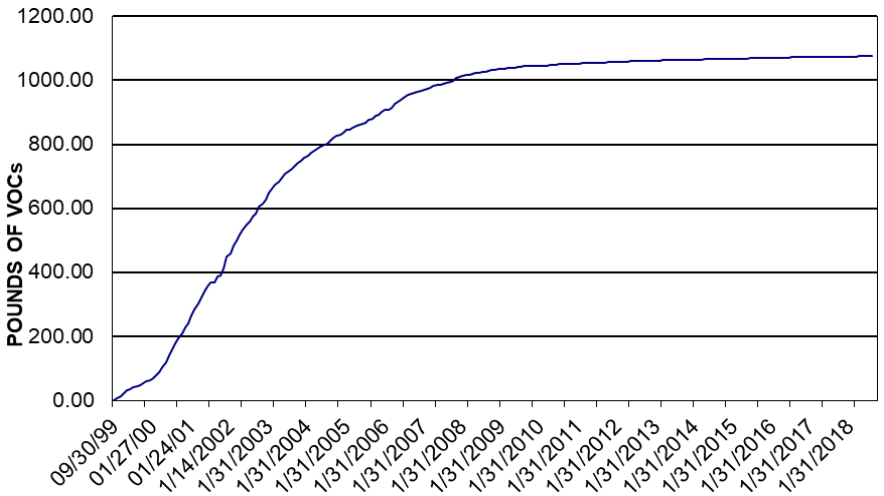
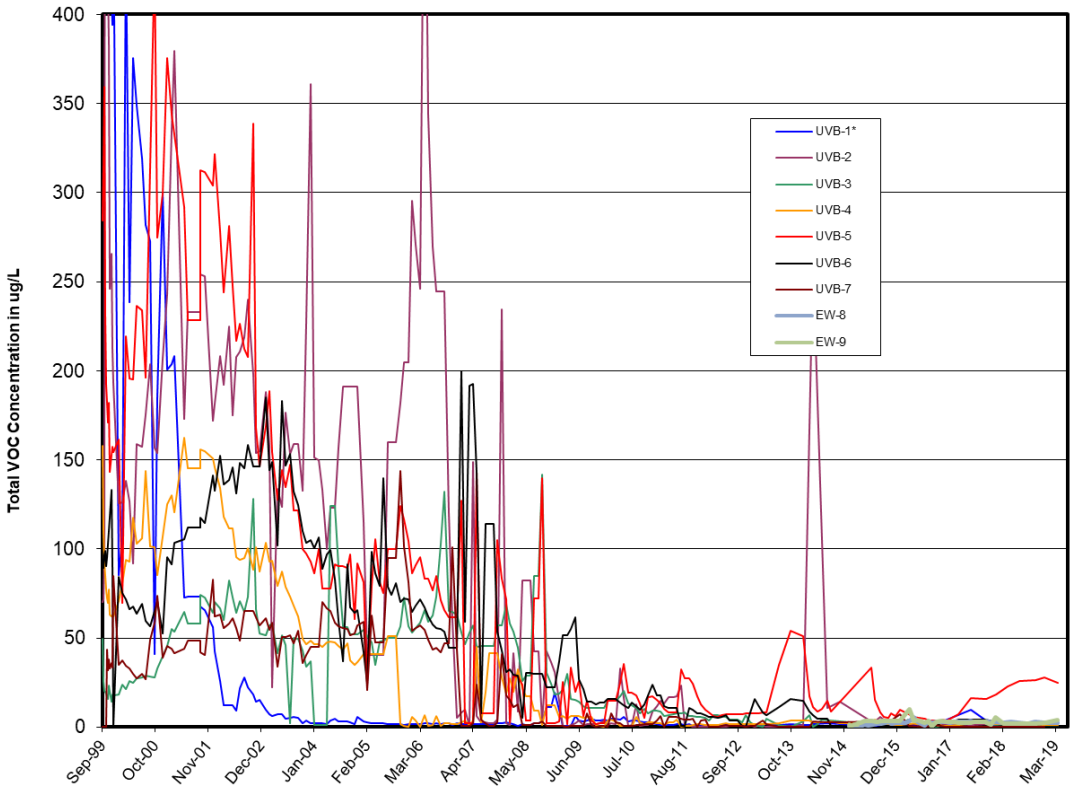


Figure 5-2
OU III Industrial Park
Influent TVOC Concentrations vs. Time



*Startup concentrations for UVB-1 are not illustrated on this graph.
TVOC concentration of 1,900 µg/L in September 1999, and 1,485 µg/L in October 1999.

Table 5-2
OU III Industrial Park Effluent Water Quality for EW-8 and EW-9
SPDES Equivalency Permit Concentrations April 1 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**265**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**6.0 – 6.4**	**SU**	**Weekly**
Carbon Tetrachloride	**5**	**<0.50**	**ug/L**	**Monthly[1]**
Chloroform	**7**	**<0.50**	**ug/L**	**Monthly[1]**
1,2-Dichloroethane	**0.6**	**<0.50**	**ug/L**	**Monthly[1]**
1,1-Dichloroethylene	**5**	**<0.50**	**ug/L**	**Monthly[1]**
Tetrachloroethylene	**5**	**<0.50**	**ug/L**	**Monthly[1]**
Trichloroethene	**5**	**<0.50**	**ug/L**	**Monthly[1]**
1,1,1-Trichloroethane	**5**	**<0.50**	**ug/L**	**Monthly[1]**

[1] The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations. Monthly sampling was initiated in August 2015.

System Operation

April 2019:

Extraction wells UVB-1 through UVB-7 remained in stand-by mode. Wells EW-8 and EW-9 were off for pulsed pumping.

May 2019:

Extraction wells UVB-1 through UVB-7 remained in stand-by mode. Wells EW-8 and EW-9 operated normally for the month. The system treated approximately 11 million gallons of water.

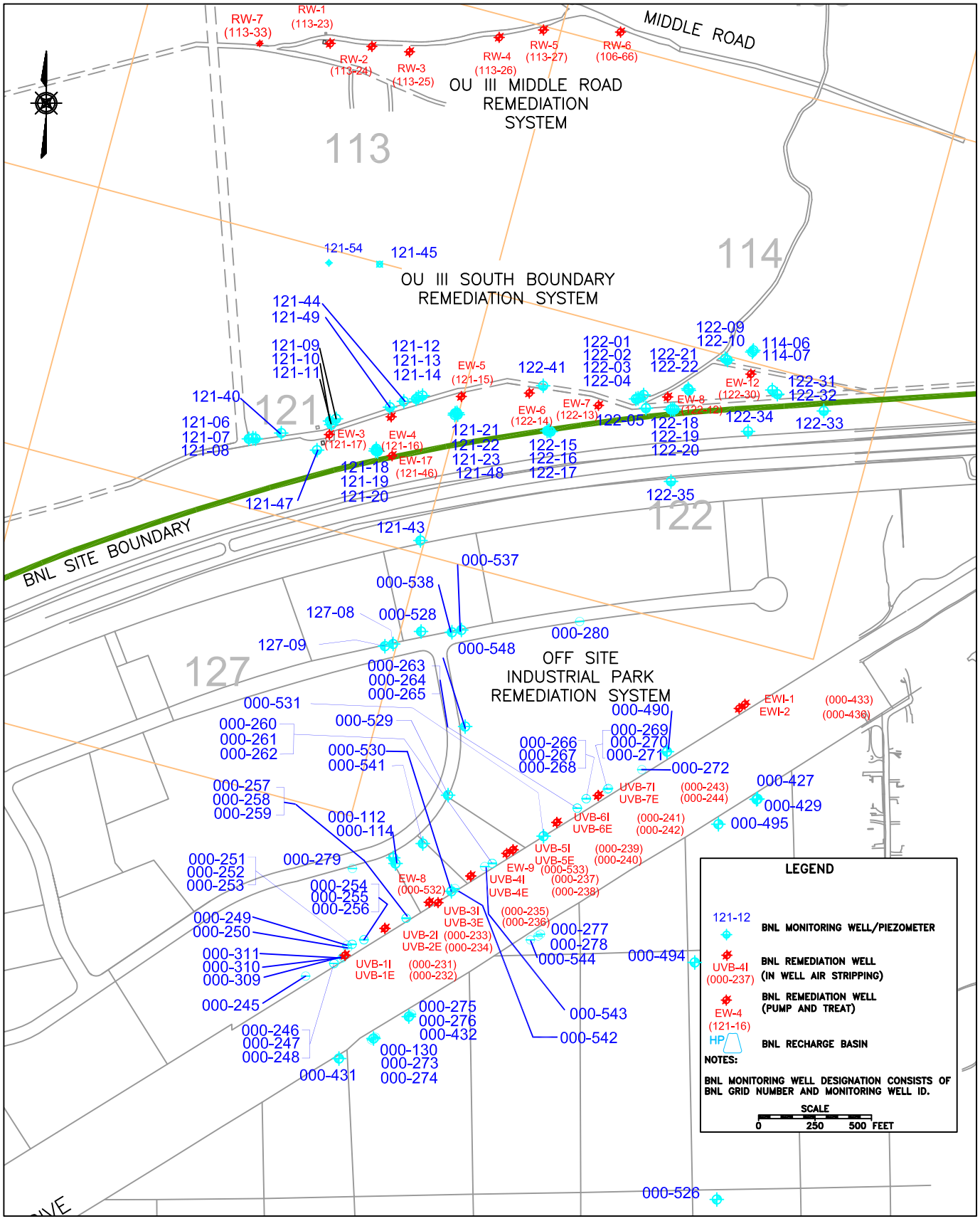
June 2019:

Extraction wells UVB-1 through UVB-7 remained in stand-by mode. Wells EW-8 and EW-9 were off for pulsed pumping.

During the second quarter 2019 the system treated approximately 11 million gallons of water

Planned Operational Changes

- Maintain the seven UVB wells in standby. If TVOC concentrations exceed the 50 µg/L capture goal adjacent to any of the wells they may be restarted. During the second quarter, TVOC concentrations in the UVB extraction wells and adjacent core monitoring wells were below 50 µg/L.
- Due to individual VOC concentrations remaining below AWQS since 2017 in IP-EW-8 and IP-EW-9, place these wells on standby in July 2019 and continue to monitor for rebound of VOCs. The maximum TVOC concentrations in the upgradient core monitoring wells in the second quarter was 46 µg/L.



\\OERNT\GIS\GW_PROJECTS\ERD_QUARTERLIES\2Q_2019\FIG 5-3.DWG

ENVIRONMENTAL PROTECTION DIVISION

TITLE: OU III SOUTH BOUNDARY/INDUSTRIAL PARK/INDUSTRIAL PARK EAST MONITORING WELL NETWORKS

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
JEB	–	09/12/14	–
CHKD:	APPD:	REV.:	NOTES:
RH	–	9/4/19	–

FIGURE NO.: 5–3

Table 5-3
OU III Industrial Park Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-112

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/17/2019	1.4	--	--	UG/L	180.00	
Chloroform	05/17/2019	1.4	0.5	--	UG/L	180.00	

Site ID : 000-249

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/16/2019	0.54	--	--	UG/L	264.00	
Tetrachloroethylene	05/16/2019	0.54	0.5	--	UG/L	264.00	

Site ID : 000-253

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/17/2019	0.79	--	--	UG/L	225.50	
Chloroform	05/17/2019	0.79	0.5	--	UG/L	225.50	

Site ID : 000-256

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/13/2019	1.79	--	--	UG/L	222.50	
Chloroform	05/13/2019	1.2	0.5	--	UG/L	222.50	
Tetrachloroethylene	05/13/2019	0.59	0.5	--	UG/L	222.50	

Site ID : 000-259

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/15/2019	3.5	--	--	UG/L	202.50	
Chloroform	05/15/2019	1.3	0.5	--	UG/L	202.50	
Tetrachloroethylene	05/15/2019	2.2	0.5	--	UG/L	202.50	

Site ID : 000-262

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/16/2019	5.1	0.5	--	UG/L	182.50	
1,1-Dichloroethylene	05/16/2019	3.6	0.5	--	UG/L	182.50	
524.2 TVOC	05/16/2019	18.1	--	--	UG/L	182.50	
Carbon tetrachloride	05/16/2019	2	0.5	--	UG/L	182.50	
Chloroform	05/16/2019	1.1	0.5	--	UG/L	182.50	
cis-1,2-Dichloroethylene	05/16/2019	1.4	0.5	--	UG/L	182.50	
Tetrachloroethylene	05/16/2019	3.3	0.5	--	UG/L	182.50	
Trichloroethylene	05/16/2019	1.6	0.5	--	UG/L	182.50	

Site ID : 000-265

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/13/2019	0	--	--	UG/L	212.50	

Site ID : 000-268

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/13/2019	0	--	--	UG/L	215.50	

Table 5-3
OU III Industrial Park Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-271

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/16/2019	0	--	--	UG/L	215.50	

Site ID : 000-273

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/13/2019	1.6	--	--	UG/L	185.00	
Chloroform	05/13/2019	1.6	0.5	--	UG/L	185.00	

Site ID : 000-274

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/13/2019	1.1	--	--	UG/L	242.00	
Chloroform	05/13/2019	1.1	0.5	--	UG/L	242.00	

Site ID : 000-275

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/15/2019	0	--	--	UG/L	134.00	

Site ID : 000-276

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/15/2019	0	--	--	UG/L	165.00	

Site ID : 000-277

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/20/2019	0.67	--	--	UG/L	147.00	
Chloroform	05/20/2019	0.67	0.5	--	UG/L	147.00	

Site ID : 000-278

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/20/2019	0.53	0.5	--	UG/L	194.00	
524.2 TVOC	05/20/2019	0.53	--	--	UG/L	194.00	

Site ID : 000-279

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/16/2019	1.79	--	--	UG/L	193.00	
Chloroform	05/16/2019	0.91	0.5	--	UG/L	193.00	
Tetrachloroethylene	05/16/2019	0.88	0.5	--	UG/L	193.00	

Site ID : 000-431

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/13/2019	0.86	--	--	UG/L	260.00	
Chloroform	05/13/2019	0.86	0.5	--	UG/L	260.00	

Site ID : 000-432

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/15/2019	0.84	--	--	UG/L	230.00	
Chloroform	05/15/2019	0.84	0.5	--	UG/L	230.00	

Table 5-3
OU III Industrial Park Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-528

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/10/2019	0.75	0.5	--	UG/L	220.00	
1,1-Dichloroethylene	05/10/2019	0.53	0.5	--	UG/L	220.00	
524.2 TVOC	05/10/2019	7.57	--	--	UG/L	220.00	
Chloroform	05/10/2019	0.51	0.5	--	UG/L	220.00	
Tetrachloroethylene	05/10/2019	5.2	0.5	--	UG/L	220.00	
Trichloroethylene	05/10/2019	0.58	0.5	--	UG/L	220.00	

Site ID : 000-529

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/13/2019	4.7	0.5	--	UG/L	219.00	
1,1-Dichloroethylene	05/13/2019	2.5	0.5	--	UG/L	219.00	
524.2 TVOC	05/13/2019	20.36	--	--	UG/L	219.00	
Carbon tetrachloride	05/13/2019	1.2	0.5	--	UG/L	219.00	
Chloroform	05/13/2019	0.75	0.5	--	UG/L	219.00	
Methyl tert-butyl ether	05/13/2019	0.91	0.5	--	UG/L	219.00	
Tetrachloroethylene	05/13/2019	7.6	0.5	--	UG/L	219.00	
Trichloroethylene	05/13/2019	2.7	0.5	--	UG/L	219.00	

Site ID : 000-530

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/16/2019	20	0.5	--	UG/L	210.00	
1,1-Dichloroethylene	05/16/2019	6	0.5	--	UG/L	210.00	
524.2 TVOC	05/16/2019	27.6	--	--	UG/L	210.00	
Trichloroethylene	05/16/2019	1.6	0.5	--	UG/L	210.00	

Site ID : 000-531

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/13/2019	4.5	0.5	--	UG/L	205.00	
1,1-Dichloroethylene	05/13/2019	3.5	0.5	--	UG/L	205.00	
1,2-Dichloroethane	05/13/2019	0.54	0.5	--	UG/L	205.00	
524.2 TVOC	05/13/2019	38.34	--	--	UG/L	205.00	
Carbon tetrachloride	05/13/2019	18	0.5	--	UG/L	205.00	
Chloroform	05/13/2019	2.5	0.5	--	UG/L	205.00	
Tetrachloroethylene	05/13/2019	1.4	0.5	--	UG/L	205.00	
Trichloroethylene	05/13/2019	7.9	0.5	--	UG/L	205.00	

Site ID : 000-537

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/10/2019	8.4	0.5	--	UG/L	245.00	
1,1-Dichloroethylene	05/10/2019	3.6	0.5	--	UG/L	245.00	
524.2 TVOC	05/10/2019	46.1	--	--	UG/L	245.00	
Carbon tetrachloride	05/10/2019	0.99	0.5	--	UG/L	245.00	
Chloroform	05/10/2019	0.71	0.5	--	UG/L	245.00	
Tetrachloroethylene	05/10/2019	24	0.5	--	UG/L	245.00	
Trichloroethylene	05/10/2019	8.4	0.5	--	UG/L	245.00	

Table 5-3
OU III Industrial Park Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-538

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/10/2019	2.7	0.5	--	UG/L	215.00	
1,1-Dichloroethylene	05/10/2019	1.4	0.5	--	UG/L	215.00	
524.2 TVOC	05/10/2019	19.4	--	--	UG/L	215.00	
Chloroform	05/10/2019	0.9	0.5	--	UG/L	215.00	
cis-1,2-Dichloroethylene	05/10/2019	1.3	0.5	--	UG/L	215.00	
Tetrachloroethylene	05/10/2019	9.5	0.5	--	UG/L	215.00	
Trichloroethylene	05/10/2019	3.6	0.5	--	UG/L	215.00	

Site ID : 000-541

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/17/2019	0.79	0.5	--	UG/L	235.00	
524.2 TVOC	05/17/2019	11.59	--	--	UG/L	235.00	
Carbon tetrachloride	05/17/2019	2.2	0.5	--	UG/L	235.00	
Chloroform	05/17/2019	2	0.5	--	UG/L	235.00	
Tetrachloroethylene	05/17/2019	3.3	0.5	--	UG/L	235.00	
Trichloroethylene	05/17/2019	3.3	0.5	--	UG/L	235.00	

Site ID : 000-542

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/16/2019	0	--	--	UG/L	235.00	

Site ID : 000-543

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/16/2019	0	--	--	UG/L	230.00	

Site ID : 000-544

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/20/2019	8.6	0.5	--	UG/L	230.00	
1,1-Dichloroethylene	05/20/2019	4.9	0.5	--	UG/L	230.00	
524.2 TVOC	05/20/2019	17.4	--	--	UG/L	230.00	
Carbon tetrachloride	05/20/2019	2.1	0.5	--	UG/L	230.00	
Chloroform	05/20/2019	0.85	0.5	--	UG/L	230.00	
Trichloroethylene	05/20/2019	0.95	0.5	--	UG/L	230.00	

Site ID : 000-548

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/10/2019	10	0.5	--	UG/L	235.00	
1,1-Dichloroethylene	05/10/2019	5.3	0.5	--	UG/L	235.00	
524.2 TVOC	05/10/2019	26.51	--	--	UG/L	235.00	
Carbon tetrachloride	05/10/2019	2.2	0.5	--	UG/L	235.00	
Chloroform	05/10/2019	0.61	0.5	--	UG/L	235.00	
Trichloroethylene	05/10/2019	8.4	0.5	--	UG/L	235.00	

Table 5-3
OU III Industrial Park Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 127-08

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/10/2019	1.2	0.5	--	UG/L	240.00	
1,1-Dichloroethylene	05/10/2019	0.71	0.5	--	UG/L	240.00	
524.2 TVOC	05/10/2019	39.77	--	--	UG/L	240.00	
Carbon tetrachloride	05/10/2019	7.2	0.5	--	UG/L	240.00	
Chloroform	05/10/2019	0.96	0.5	--	UG/L	240.00	
Tetrachloroethylene	05/10/2019	27	0.5	--	UG/L	240.00	
Trichloroethylene	05/10/2019	2.7	0.5	--	UG/L	240.00	

Site ID : 127-09

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/10/2019	6.6	--	--	UG/L	225.00	
Carbon tetrachloride	05/10/2019	1.3	0.5	--	UG/L	225.00	
Chloroform	05/10/2019	1.2	0.5	--	UG/L	225.00	
Tetrachloroethylene	05/10/2019	4.1	0.5	--	UG/L	225.00	

Table 5-4
OU III Industrial Park Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 000-532 (EW-8)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/10/2019	0.69	0.5	--	UG/L	253.00	
524.2 TVOC	04/10/2019	2.49	--	--	UG/L	253.00	
Tetrachloroethylene	04/10/2019	1.8	0.5	--	UG/L	253.00	

Site ID : 000-533 (EW-9)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/10/2019	1.9	0.5	--	UG/L	243.00	
1,1-Dichloroethane	04/10/2019	0.64	0.5	--	UG/L	243.00	
1,1-Dichloroethylene	04/10/2019	1.5	0.5	--	UG/L	243.00	
524.2 TVOC	04/10/2019	4.04	--	--	UG/L	243.00	

Table 5-5
OU III Industrial Park Influent Data
"Hits Only" - April through June 2019

Site ID : 000-231 (UVB-1 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/17/2019	0	--	--	UG/L	230.00	

Site ID : 000-235 (UVB-3 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/17/2019	0	--	--	UG/L	204.00	

Site ID : 000-237 (UVB-4 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/17/2019	1.1	--	--	UG/L	180.00	
Tetrachloroethylene	04/17/2019	1.1	0.5	--	UG/L	180.00	

Site ID : 000-239 (UVB-5 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/17/2019	2.8	0.5	--	UG/L	190.00	
1,1-Dichloroethylene	04/17/2019	1.6	0.5	--	UG/L	190.00	
524.2 TVOC	04/17/2019	24.2	--	--	UG/L	190.00	
Carbon tetrachloride	04/17/2019	9.8	0.5	--	UG/L	190.00	
Chloroform	04/17/2019	1.3	0.5	--	UG/L	190.00	
cis-1,2-Dichloroethylene	04/17/2019	1	0.5	--	UG/L	190.00	
Tetrachloroethylene	04/17/2019	2.8	0.5	--	UG/L	190.00	
Trichloroethylene	04/17/2019	4.9	0.5	--	UG/L	190.00	

Site ID : 000-241 (UVB-6 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/17/2019	0	--	--	UG/L	200.00	

Site ID : 000-243 (UVB-7 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/17/2019	0	--	--	UG/L	215.00	

Table 5-6
OU III Industrial Park Influent Data
"Hits Only" - April through June 2019

Site ID : 000-534 (Influent for EW-8 and EW-9)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/02/2019	0.64	0.5	--	UG/L	0.00	
524.2 TVOC	05/02/2019	1.58	--	--	UG/L	0.00	
Tetrachloroethylene	05/02/2019	0.94	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/14/2019	0.63	0.5	--	UG/L	0.00	
524.2 TVOC	05/14/2019	1.57	--	--	UG/L	0.00	
Tetrachloroethylene	05/14/2019	0.94	0.5	--	UG/L	0.00	

Table 5-7
OU III Industrial Park Effluent Data
"Hits Only" - April through June 2019

Site ID : 000-536 (Effluent for EW-8 and EW-9)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/02/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/14/2019	0	--	--	UG/L	0.00	

Section 6

OU III Former Carbon Tetrachloride Pump & Treat System (System Closed)

The Draft Petition for Closure for the OU III Carbon Tetrachloride Groundwater Removal Action was submitted to the regulators for review in August 2009. Following the incorporation of EPA comments, in October 2009 the Final Petition for Closure for the OU III Carbon Tetrachloride Groundwater Removal Action was issued to the regulators. EPA and NYSDEC provided approval in October 2009. Since that time, activities have been concluded with decommissioning and dismantling of the Carbon Tetrachloride treatment system. A decommissioning report was submitted to the regulators in March 2011.

Section 7
Q2-2019 Operations Summary
OU III Building 96 Pump and Treat System

Process: Three (3) re-circulation wells each connected to an individual shallow tray air-stripping unit and one (1) well with a shallow tray air-stripping unit, with discharge to a drainage culvert and Recharge Basin HS.

Goal: Remediation of the volatile organic compounds (VOCs) in the source area and reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: January 2001

Table 7-1
OU III Building 96
Pumping Rates (gpm)

Recirculation Treatment Well	RTW-1	RTW-2	RTW-3	RTW-4
Site Id #	095-151	095-153	095-155	095-157
Screen Interval (feet bls)	48-58	48-58	48-58	48-58
Desired Flow Rate (gpm)	30	30	0	0
April	34	33	0	0
May	26	2	0	0
June	13	25	0	0
Actual (Avg. over Qtr.)	**24**	**20**	**0**	**0**

Note: RTW-1 was restarted in 2008 with discharge to Basin HS. RTW-2 and RTW-3 were placed in standby mode in January 2016. RTW-4 was placed in stand-by mode in 2012. RTW-2 was restarted in November 2018.

Figure 7-1
OU III Building 96
Cumulative Mass Removal of VOC's vs. Time

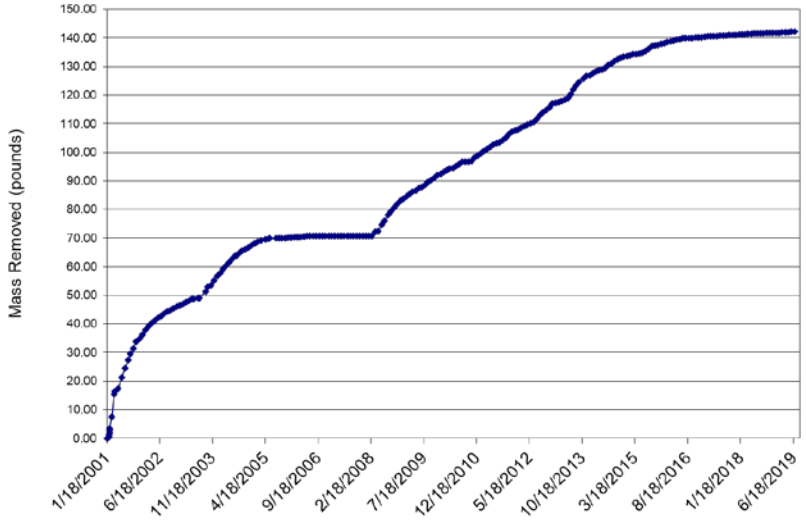


Figure 7-2
OU III Building 96
Influent TVOC Concentrations vs. Time

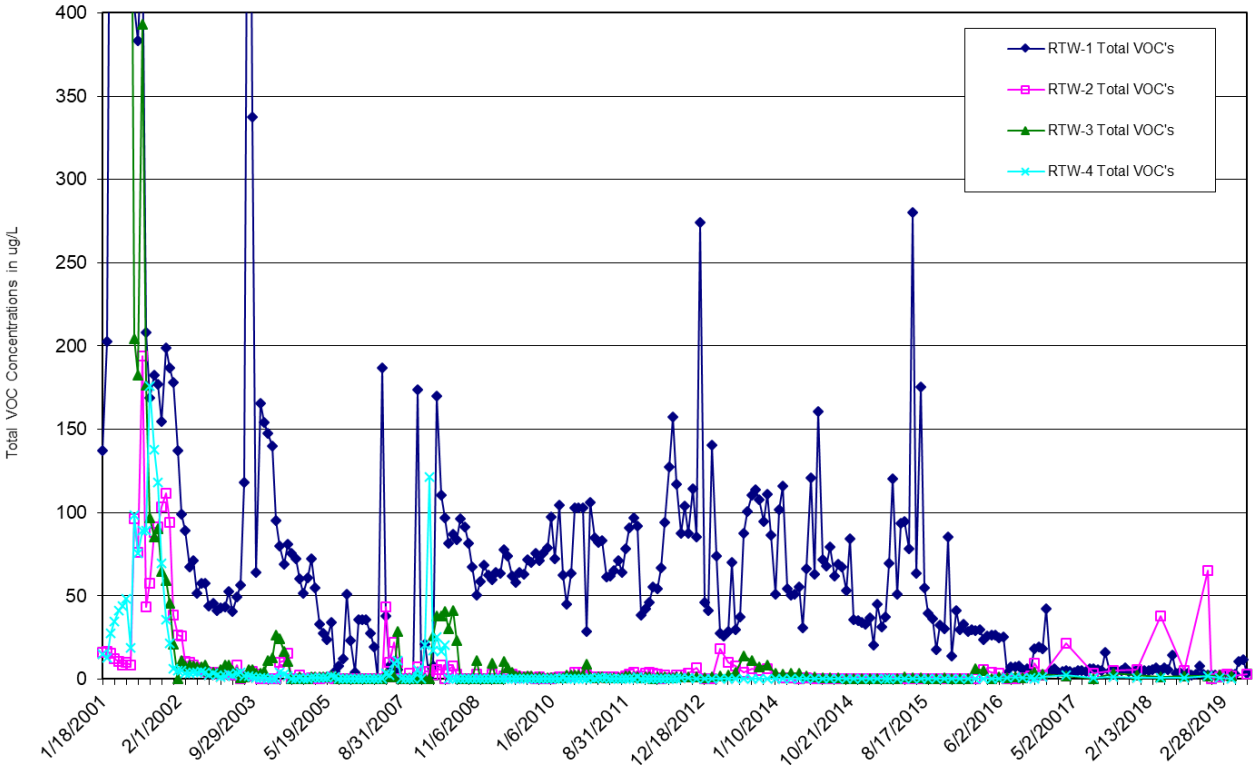


Table 7-2
Effluent Water Quality for RTW-1
SPDES Equivalency Permit Concentrations April 1, 2019– June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency*
Flow	**40**	**34**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**6.4 – 7.8**	**SU**	**Weekly**
Chromium (hexavalent)	**100**	**<0.5**	**ug/L**	**Monthly**
Tetrachloroethylene	**5.0**	**<0.5**	**ug/L**	**Monthly**
1,1,1-Trichloroethane	**5.0**	**<0.5**	**ug/L**	**Monthly**
Thallium	**Monitor**	**<2.0**	**ug/L**	**Monthly**
Trichlorofluoromethane	**5.0**	**<0.5**	**ug/L**	**Monthly**
Methyl Bromide	**5.0**	**<0.5**	**ug/L**	**Monthly**
Methyl Chloride	**5.0**	**<0.5**	**ug/L**	**Monthly**
Methylene Chloride	**5.0**	**<0.5**	**ug/L**	**Monthly**

ND = Not detected.

* The required effluent sampling frequency is monthly following a period of 24 consecutive weekly with no exceedances. Weekly for pH.

System Operations

April 2019:

The system ran normally for the month. RTW-3 and RTW-4 remained in standby mode. The system treated approximately 2.7 million gallons of water.

May 2019:

RTW-1 was off from May 23rd to June 5th for programming repair to the PLC. Well RTW-2 was off most of the month due to electrical issues. RTW-3 and RTW-4 remained in standby mode. The system treated approximately 1 million gallons of water.

June 2019:

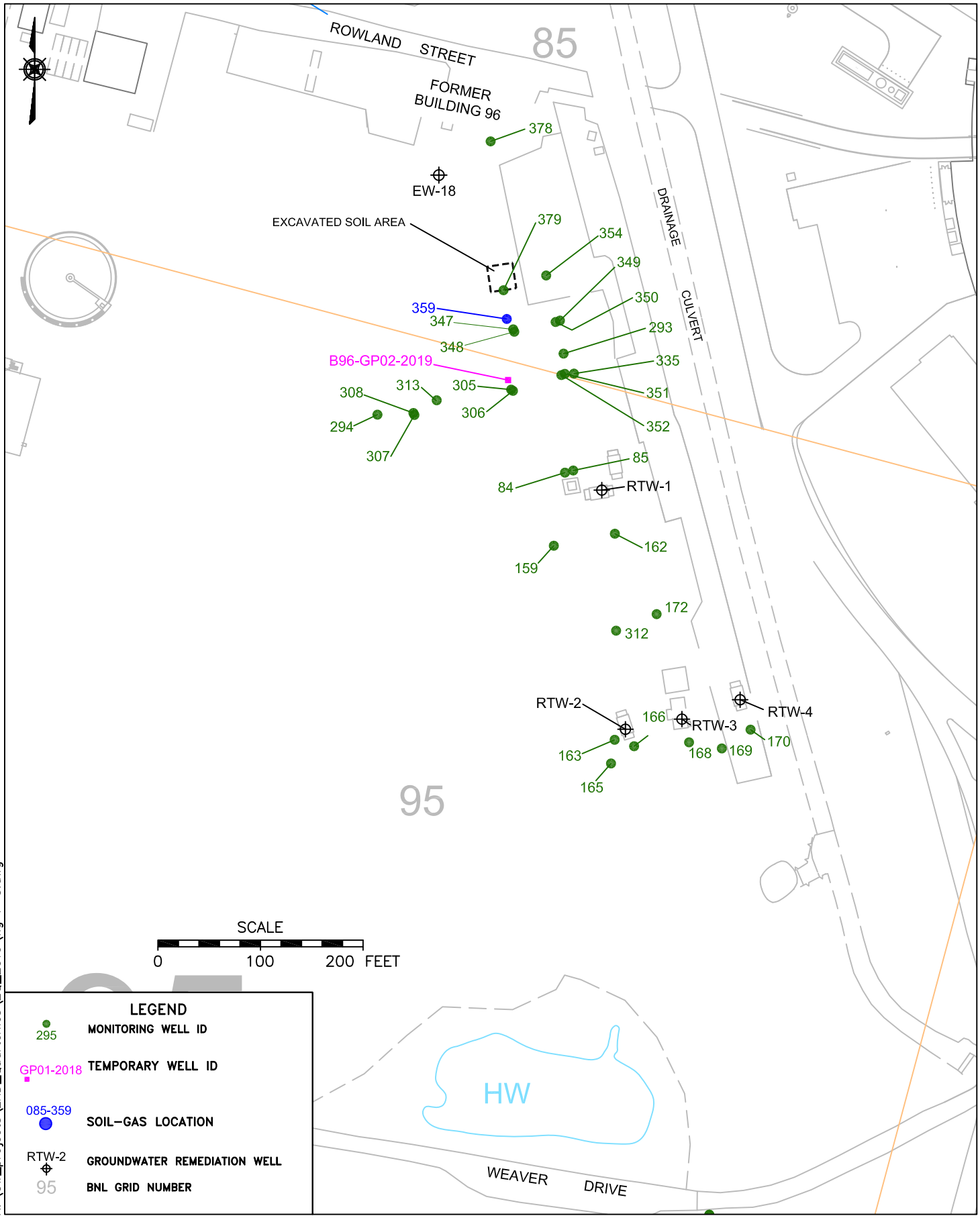
RTW-1 was off from June 6th to June 24th to install a new pump and motor. Well RTW-1 was restarted June 25th and the pumping rate was increased from 30 gallons per minute (gpm) to 60 gpm to ensure capture of VOCs in the western portion of the plume. The NYSDEC Project Manager was informed via email May 9th that the discharge from Building 96 extraction well RTW-1 will be reported under the Building 452 Freon 11 SPDES Equivalency permit limits beginning on or about July 1, 2019. Wells RTW-3 and RTW-4 remained in standby mode. The system treated approximately 1.5 million gallons of water.

The system treated approximately 5.2 million gallons of water during the second quarter of 2019.

During the second quarter of 2019, the highest PCE concentration in the Building 96 monitoring wells was 230 µg/L in well 095-159. The maximum PCE detection in extraction well RTW-1 in the second quarter was 10 µg/L. Trichlorofluoromethane (Freon-11) was detected at 0.69 µg/L in RTW-1.

Planned Operational Changes

- Maintain full time operation of treatment well RTW-1 at 60 gpm. Continue operating RTW-2 based on elevated TVOC concentrations observed in upgradient well 095-159. Maintain a monthly sampling frequency of the influent and effluent.
- Maintain a monthly monitoring frequency for well 095-159 to monthly to evaluate the influence of increased pumping rate of RTW-1 and westward expansion of the capture zone.
- Maintain treatment wells RTW-3 and RTW-4 in standby mode and continue quarterly sampling. Restart any of the wells if extraction or monitoring well data indicate that TVOC concentrations exceed 50 µg/L. During the second quarter of 2019, the maximum TVOC concentration was 73 µg/L in monitoring well 095-172. However, TVOC concentrations dropped off to 3 µg/L in July. This well is located between extraction well RTW-1 and RTW-3. If TVOC concentrations increase again in the fourth quarter, then well RTW-3 will be restarted. Neither RTW-3 or RTW-4 exceeded a TVOC concentration of 50 µg/L.
- Install a monitoring well at the location of B96-GP02-2019 and screen from -15 to -25 feet mean sea level (ft. msl.).



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BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III BUILDING 96 MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
AJZ	–	06/15/18	–
CHKD:	APPD:	REV.:	NOTES:
JEB	WRD	10/1/19	–

FIGURE NO.: 7-3

Table 7-3
OU III Building 96 Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 085-293

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/04/2019	0	--	--	UG/L	50.00	

Site ID : 085-335

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/04/2019	12	--	--	UG/L	35.00	
Tetrachloroethylene	04/04/2019	12	0.5	--	UG/L	35.00	

Site ID : 085-347

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/05/2019	8.4	--	--	UG/L	22.50	
Tetrachloroethylene	04/05/2019	8.4	0.5	--	UG/L	22.50	

Site ID : 085-348

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/05/2019	24	--	--	UG/L	34.50	
Tetrachloroethylene	04/05/2019	24	0.5	--	UG/L	34.50	

Site ID : 085-349

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/04/2019	18	--	--	UG/L	22.50	
Tetrachloroethylene	04/04/2019	18	0.5	--	UG/L	22.50	

Site ID : 085-350

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/04/2019	13	--	--	UG/L	34.50	
Tetrachloroethylene	04/04/2019	13	0.5	--	UG/L	34.50	

Site ID : 085-351

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/04/2019	17	--	--	UG/L	22.50	
Tetrachloroethylene	04/04/2019	17	0.5	--	UG/L	22.50	

Site ID : 085-352

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/04/2019	25	--	--	UG/L	34.50	
Tetrachloroethylene	04/04/2019	25	0.5	--	UG/L	34.50	

Site ID : 085-354

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/05/2019	15	--	--	UG/L	22.50	
Tetrachloroethylene	04/05/2019	15	0.5	--	UG/L	22.50	

Site ID : 085-378

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/05/2019	0	--	--	UG/L	22.12	

Table 7-3
OU III Building 96 Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 085-379

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/04/2019	97	5	--	UG/L	18.75	

Site ID : 095-159

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/08/2019	98	2.5	--	UG/L	50.00	
Tetrachloroethylene	05/02/2019	230	5	--	UG/L	50.00	
Tetrachloroethylene	06/04/2019	110	5	--	UG/L	50.00	

Site ID : 095-162

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	8.3	--	--	UG/L	50.00	
Chloroform	04/10/2019	1.1	0.5	--	UG/L	50.00	
Tetrachloroethylene	04/10/2019	7.2	0.5	--	UG/L	50.00	

Site ID : 095-163

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0	--	--	UG/L	50.00	

Site ID : 095-165

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0	--	--	UG/L	50.00	

Site ID : 095-166

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0	--	--	UG/L	50.00	

Site ID : 095-168

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0	--	--	UG/L	50.00	

Site ID : 095-169

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0	--	--	UG/L	50.00	

Site ID : 095-170

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	0	--	--	UG/L	50.00	

Site ID : 095-172

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/03/2019	73	2.5	--	UG/L	50.00	

Table 7-3
OU III Building 96 Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 095-294

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	9.9	--	--	UG/L	27.50	
Tetrachloroethylene	04/09/2019	9.9	0.5	--	UG/L	27.50	

Site ID : 095-305

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/05/2019	6	--	--	UG/L	22.50	
Tetrachloroethylene	04/05/2019	6	0.5	--	UG/L	22.50	

Site ID : 095-306

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tetrachloroethylene	04/05/2019	47	5	--	UG/L	34.50	

Site ID : 095-307

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	7.2	--	--	UG/L	32.50	
Tetrachloroethylene	04/09/2019	7.2	0.5	--	UG/L	32.50	

Site ID : 095-308

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	6.4	--	--	UG/L	37.50	
Tetrachloroethylene	04/09/2019	6.4	0.5	--	UG/L	37.50	

Site ID : 095-312

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	21	--	--	UG/L	50.00	
Tetrachloroethylene	04/03/2019	21	0.5	--	UG/L	50.00	

Site ID : 095-318

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	2.16	--	--	UG/L	65.00	
Chloroform	04/10/2019	0.76	0.5	--	UG/L	65.00	
Tetrachloroethylene	04/10/2019	1.4	0.5	--	UG/L	65.00	

Site ID : 095-84

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/08/2019	13	--	--	UG/L	25.00	
Tetrachloroethylene	04/08/2019	13	0.5	--	UG/L	25.00	

Site ID : 095-85

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/08/2019	0	--	--	UG/L	95.00	

Table 7-4
OU III Building 96 Influent Data
"Hits Only" - April through June 2019

Site ID : 095-151 (RTW-1 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/02/2019	2.9	--	--	UG/L	0.00	
Tetrachloroethylene	04/02/2019	2.9	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	2.8	--	--	UG/L	0.00	
Tetrachloroethylene	04/16/2019	2.8	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	10.61	--	--	UG/L	0.00	
Chloroform	05/01/2019	0.71	0.5	--	UG/L	0.00	
Tetrachloroethylene	05/01/2019	9.9	0.5	--	UG/L	0.00	
524.2 TVOC	05/14/2019	11.45	--	--	UG/L	0.00	
Chloroform	05/14/2019	0.76	0.5	--	UG/L	0.00	
Tetrachloroethylene	05/14/2019	10	0.5	--	UG/L	0.00	
Trichlorofluoromethane	05/14/2019	0.69	0.5	--	UG/L	0.00	
524.2 TVOC	06/25/2019	3.71	--	--	UG/L	0.00	
Chloroform	06/25/2019	0.51	0.5	--	UG/L	0.00	
Tetrachloroethylene	06/25/2019	3.2	0.5	--	UG/L	0.00	

Site ID : 095-153 (RTW-2 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/02/2019	2.1	--	--	UG/L	0.00	
Tetrachloroethylene	04/02/2019	2.1	0.5	--	UG/L	0.00	
524.2 TVOC	06/19/2019	2.9	--	--	UG/L	0.00	
Tetrachloroethylene	06/19/2019	2.9	0.5	--	UG/L	0.00	

Site ID : 095-155 (RTW-3 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/02/2019	1.8	--	--	UG/L	0.00	
Tetrachloroethylene	04/02/2019	1.8	0.5	--	UG/L	0.00	

Site ID : 095-157 (RTW-4 Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/02/2019	0	--	--	UG/L	0.00	

Table 7-5
OU III Building 96 Effluent Data
"Hits Only" - April through June 2019

Site ID : 095-152 (RTW-1 Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Thallium	05/14/2019	0.94	2	--	UG/L	0.00	B
Thallium	06/25/2019	1.8	2	--	UG/L	0.00	B

Site ID : 095-154 (RTW-2 Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/19/2019	0	--	--	UG/L	0.00	

Qualifiers :

J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.
B = Result is between instrument detection limit and contract required reporting limit.

Section 8

OU IV Former Air Sparge/Soil Vapor Extraction System (System Closed)

A petition was submitted in June 2002 for closure of this project. The EPA and DEC provided their approval for system closure in July 2003. The system was decommissioned in the fall of 2003. Per the *2010 Groundwater Status Report*, groundwater monitoring related to the OU I Air Sparge/Soil Vapor Extraction System is concluded.

Section 9

Q2-2019 Operations Summary
OU VI Ethylene Dibromide Pump & Treat System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells.

Goal: Reach the ethylene dibromide Maximum Contaminant Level (MCL) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: October 2004

Table 9-1
OU VI Ethylene Dibromide Pump and Treat System
Pumping Rates (gpm)

Extraction Well	EW-1E	EW-2E
Site Id #	000-503	000-504
Screened Interval (feet below grade)	115-135	115-135
Desired Flow Rate (GPM)	160	190
April	72	45
May	61	14
June	160	177
Actual (Avg. over Qtr.)	**98**	**79**

Figure 9-1
OU VI Cumulative Mass Removal of EDB vs. Time

Note: Due to the low concentrations of ethylene dibromide in the extraction wells, presentation of a mass removal graph is not appropriate.

Figure 9-2
OU VI Ethylene Dibromide
Influent EDB Concentration vs. Time

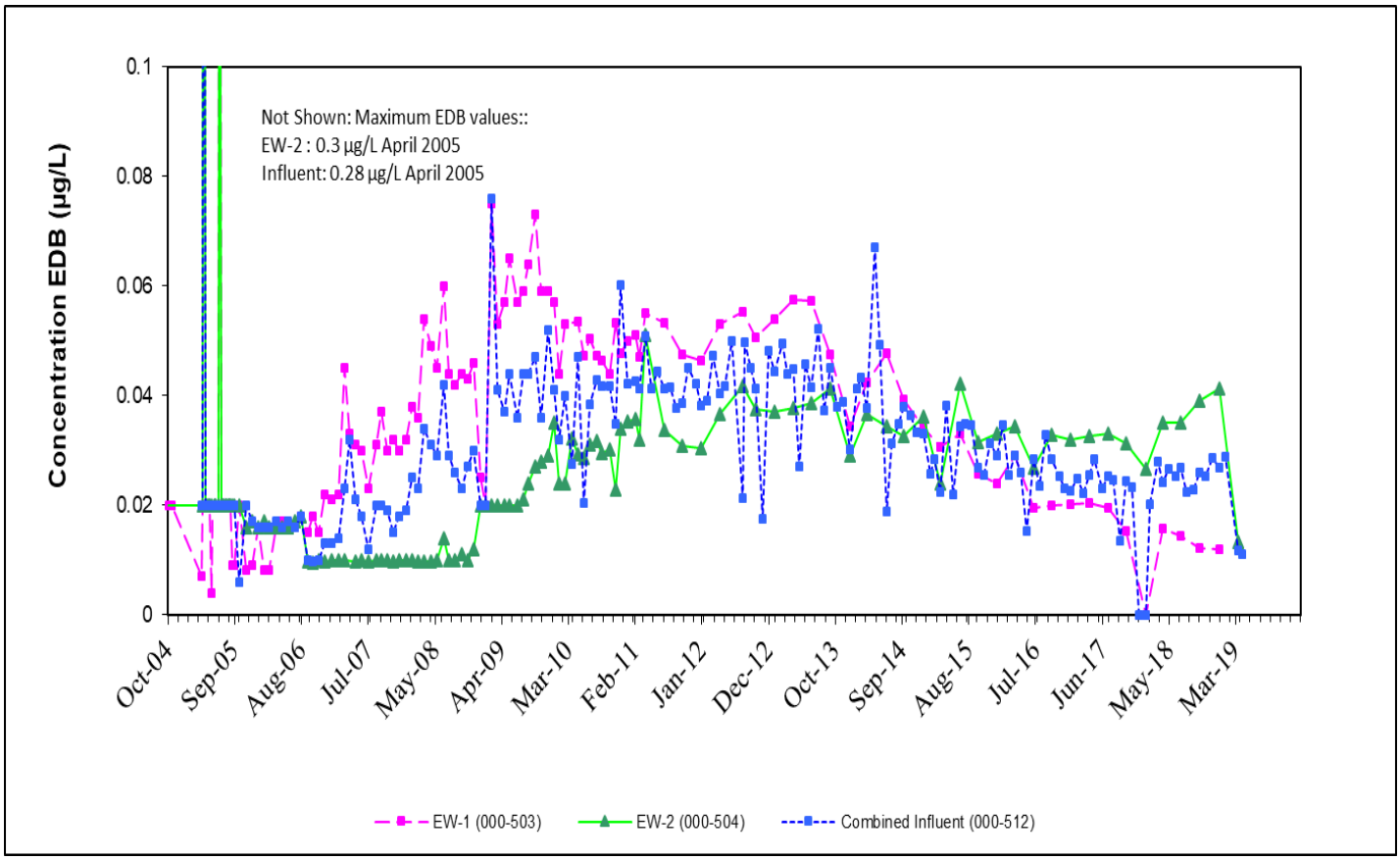


Table 9-2
OU VI Ethylene Dibromide Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1, 2019 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**450**	**337**	**GPM**	**Continuous**
pH	**5.0 - 8.5**	**5.3-7.0**	**SU**	**Weekly**
Ethylene Dibromide	**.03**	**<0.02**	**ug/L**	**Monthly****
Chloroform	**7.0**	**<0.5**	**ug/L**	**Monthly****
1,1-Dichloroethene	**5.0**	**<0.5**	**ug/L**	**Monthly****
1,1,1-Trichloroethane	**5.0**	**<0.5**	**ug/L**	**Monthly****
Methyl Chloride	**5.0**	**<0.5**	**ug/L**	**Monthly****
Methylene Chloride	**5.0**	**<0.5**	**ug/L**	**Monthly****

***Minimum to maximum value for pH during this operational period.**
** **The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations.**

System Operations Summary

April 2019:

The system was off April 1st to April 10th for diffusion well development. Extraction well EW-2 was off April 17th to April 30th to replace the pump and motor. The system treated approximately 5 million gallons of water.

May 2019:

The system was off from May 9th to May 26th for diffusion well development. Extraction well EW-1 remained off May 26th to June 5th for maintenance work. The system treated approximately 3 million gallons of water.

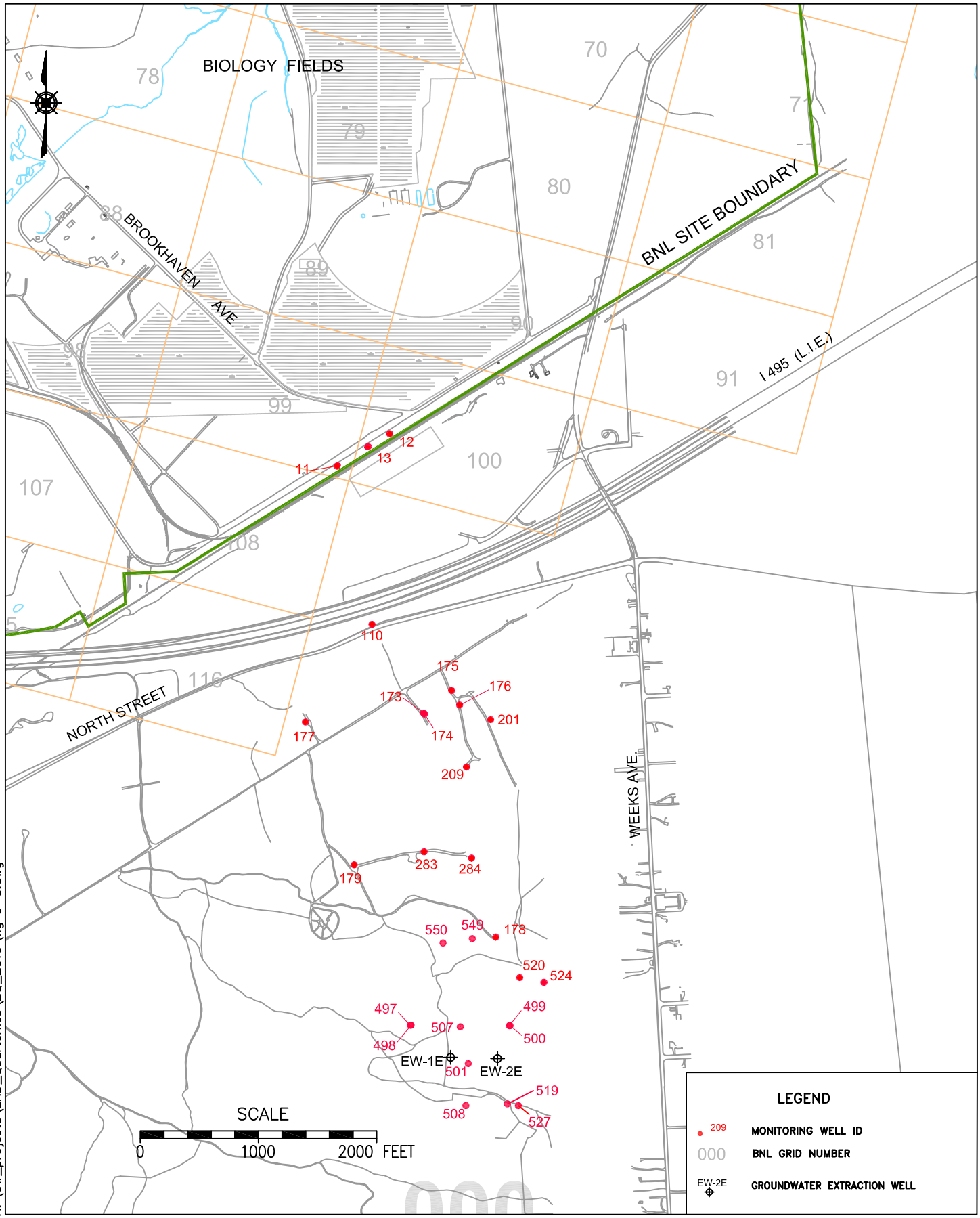
June 2019:

Extraction well EW-1 was placed back in operation June 5th and EW-2 ran normally for the month. The system treated approximately 14 million gallons of water.

The system treated approximately 22 million gallons of water during the second quarter of 2019.

Planned Operational Changes

- Maintain full time operation of the treatment system and continue quarterly sampling of the extraction wells.
- Update the groundwater model based on the analytical results from the two vertical profiles installed in December 2018 to better refine the remaining time required to remediate the EDB plume to below the drinking water standard.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU VI EDB

SITEWIDE REMEDIATION SYSTEMS

SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	09/26/05	–
CHKD:	APPD:	REV.:	NOTES:
RH	--	09/4/19	–

FIGURE NO.: 9-3

Table 9-3
OU VI Ethylene Dibromide Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-178

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/07/2019	0.28	0.0201	--	UG/L	133.00	

Site ID : 000-283

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/06/2019	0.141	0.0199	--	UG/L	107.00	

Site ID : 000-284

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/06/2019	0.096	0.0193	--	UG/L	107.00	

Site ID : 000-498

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/05/2019	0.0131	0.0194	--	UG/L	135.00	J

Site ID : 000-499

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/05/2019	0.0305	0.0196	--	UG/L	110.00	

Site ID : 000-500

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/05/2019	0.192	0.0198	--	UG/L	135.00	

Site ID : 000-507

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/05/2019	0.0919	0.0197	--	UG/L	125.00	

Site ID : 000-520

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	06/05/2019	0.0284	0.0196	--	UG/L	140.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Table 9-4
OU VI Ethylene Dibromide Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 000-503 (EW-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	1.74	--	--	UG/L	0.00	
Chloroform	04/10/2019	1.36	0.5	--	UG/L	0.00	
Methyl tert-butyl ether	04/10/2019	0.38	0.5	--	UG/L	0.00	J

Site ID : 000-504 (EW-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	1.25	--	--	UG/L	0.00	
Chloroform	04/10/2019	1.25	0.5	--	UG/L	0.00	
EDB	04/10/2019	0.0134	0.0196	--	UG/L	0.00	J

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Table 9-5
OU VI Ethylene Dibromide Influent Data
"Hits Only" - April through June 2019

Site ID : 000-512 (Combined Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	1.58	--	--	UG/L	0.00	
Chloroform	04/10/2019	1.41	0.5	--	UG/L	0.00	
EDB	04/10/2019	0.0118	0.0193	--	UG/L	0.00	J
Methyl tert-butyl ether	04/10/2019	0.17	0.5	--	UG/L	0.00	J
524.2 TVOC	05/02/2019	1.24	--	--	UG/L	0.00	
Chloroform	05/02/2019	1.24	0.5	--	UG/L	0.00	
EDB	05/02/2019	0.011	0.0196	--	UG/L	0.00	J
524.2 TVOC	06/05/2019	0	--	--	UG/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Table 9-6
OU VI Ethylene Dibromide Effluent Data
"Hits Only" - April through June 2019

Site ID : 000-510 (System Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/02/2019	0	--	--	UG/L	0.00	
524.2 TVOC	06/05/2019	0	--	--	UG/L	0.00	

Section 10

Q-2 2019 Quarterly Operations Summary
OU III HFBR Tritium Pump and Recharge System
(System Closed)

Process: Pump and recharge (to the RAV basin) with monitored natural attenuation for tritium. Carbon filtration is also included in the pump and recharge system to remove VOCs that are also present in the groundwater.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030). NYSDEC and EPA approved of the Petition for Closure in August 2018 and March 2019, respectively.

Start Date: May 1997

Table 10-1
OU III HFBR Pump and Recharge System
Pumping Rates (gpm)

Extraction Well	**EW-9**	**EW-10**	**EW-11**	**EW-16**
Site Id #	105-40	105-39	105-41	096-119
Screen Interval (ft bls)	130-150	130-150	130-150	80-120
Desired Flow Rate (gpm)	0 *	0 *	0 *	0 *
April (Avg monthly gpm)	0	0	0	0
May "	0	0	0	0
June "	0	0	0	0
Actual (Avg. over Qtr.)	**0**	**0**	**0**	**0**

* The system was approved for closure in March 2019.

Figure 10-1
OU III HFBR Pump & Treat System
Extraction Wells Tritium Concentrations vs. Time

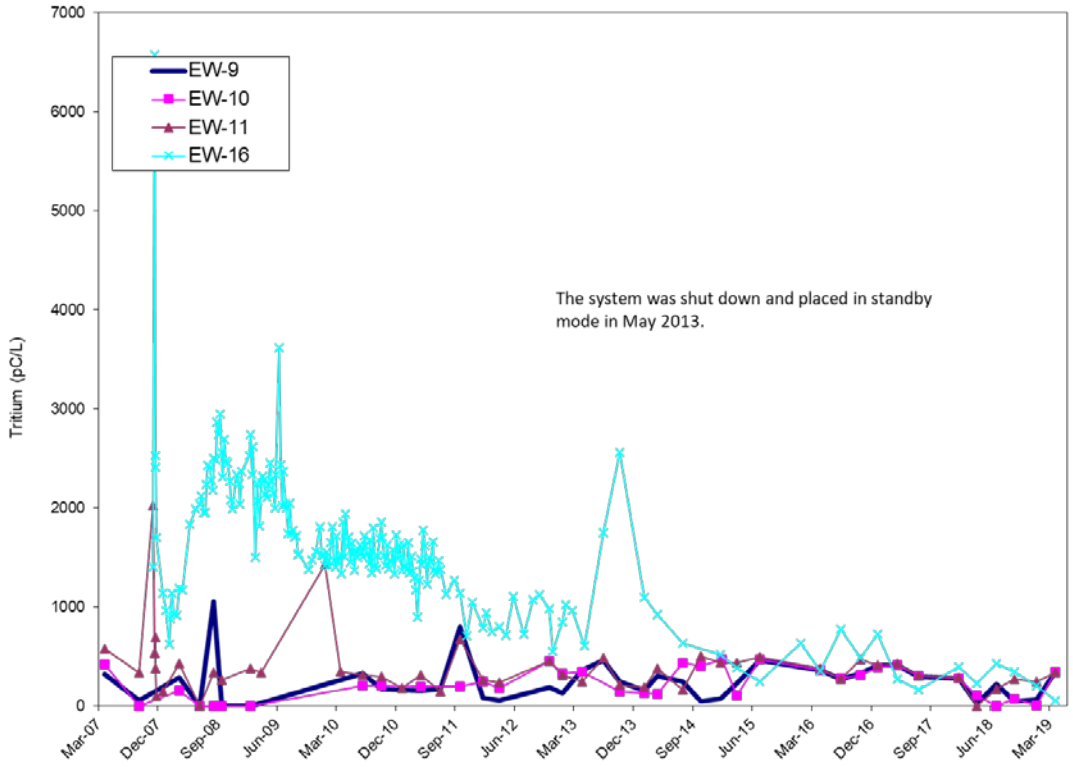


Table 10-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1, 2019 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	NA	GPD	Continuous
pH (range)	5.6 - 8.5	NA	SU	Weekly
Carbon Tetrachloride	5.0	NA	ug/L	2/Month
Chloroform	7.0	NA	ug/L	2/Month
1,1-Dichloroethane	5.0	NA	ug/L	2/Month

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
1,2-Dichloroethane	**0.6**	**NA**	**ug/L**	**2/Month**
1,1-Dichloroethene	**5.0**	**NA**	**ug/L**	**2/Month**
Cis-1,2-Dichloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**
trans-1,2-Dichloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**
Tetrachloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**
1,1,1-Trichloroethane	**5.0**	**NA**	**ug/L**	**2/Month**
Trichloroethylene	**5.0**	**NA**	**ug/L**	**2/Month**

NA = Not applicable. The system is closed.

Monitoring Activities

The current monitoring well network is depicted on Figure 10-1. The second quarter monitoring well analytical results are shown on Table 10-3.

The highest tritium concentration immediately downgradient of the HFBR in the second quarter of 2019 was 16,500 pCi/L in well 075-803. This well is located on the lawn of the HFBR immediately north of Cornell Avenue.

The extraction wells associated with this system, EW-9, EW-10, EW-11, and EW-16 are sampled on a quarterly basis through July 2019. They will then be discontinued since the regulators approved closure of the system. The detections for these wells for the second quarter are presented in Table 10-4. During this sampling round, tritium was not detected in any of the extraction wells.

System Operations

April 2019:

The system remained in standby mode.

May 2019:

The system remained in standby mode.

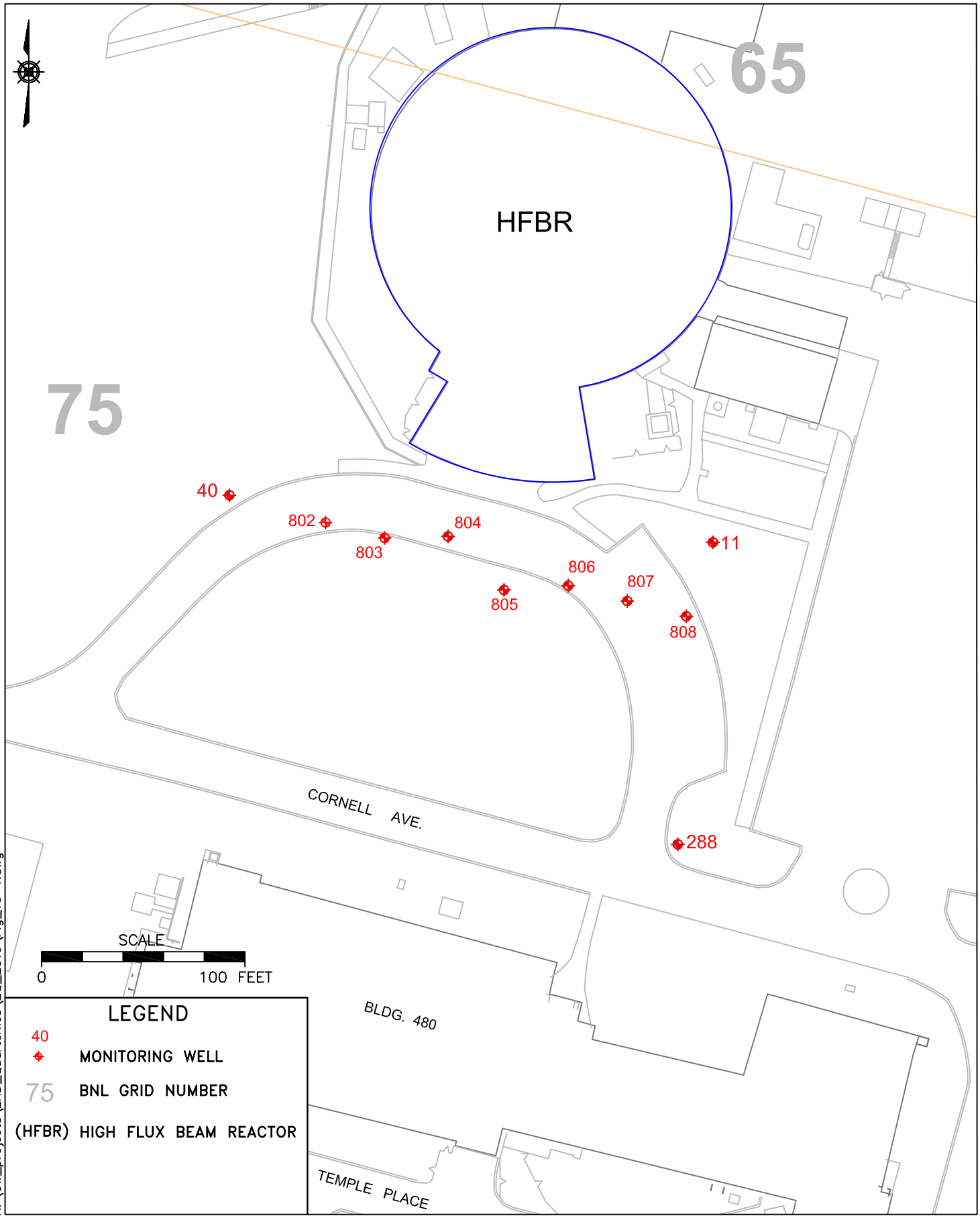
June 2019:

The system remained in standby mode.

The New York State Department of Environmental Conservation and New York State Department of Health provided their approval of the Petition for Closure of the Pump and Recharge System in August 2018. The United States Environmental Protection Agency provided approval of the Petition for Closure in March 2019.

Planned Operational Changes

- Monitor the source area with a combination of the seven new monitoring wells and three existing wells. The monitoring data will continue to be documented in the annual Groundwater Status Report.



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BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III HFBR AOC 29, SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT:HZ.:	DATE:	PROJECT NO.:
AJZ	–	06/14/18	–
CHKD:	APPD:	REV.:	NOTES:
JEB	RH	8/22/19	–

FIGURE NO.: 10-1

Table 10-3
OU III HFBR Tritium Plume Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 065-37

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/04/2019	14	0.756	1.28	PCI/L	71.10	

Site ID : 065-39

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/12/2019	31.4	0.231	2.73	PCI/L	87.40	

Site ID : 075-210

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	0.537	0.216	0.174	PCI/L	58.00	

Site ID : 075-803

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/02/2019	16500	229	1730	PCI/L	50.63	

Site ID : 075-804

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/02/2019	9110	229	973	PCI/L	51.03	

Site ID : 075-805

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/02/2019	13700	231	1440	PCI/L	50.70	

Site ID : 075-808

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/01/2019	497	230	154	PCI/L	48.02	

Site ID : 105-23

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/18/2019	0.61	0.5	--	UG/L	180.00	
1,1-Dichloroethylene	04/18/2019	0.69	0.5	--	UG/L	180.00	
524.2 TVOC	04/18/2019	16.3	--	--	UG/L	180.00	
Tetrachloroethylene	04/18/2019	15	0.5	--	UG/L	180.00	

Site ID : 105-44

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,2,3-Trichlorobenzene	04/22/2019	0.68	0.5	--	UG/L	152.50	
524.2 TVOC	04/22/2019	2.08	--	--	UG/L	152.50	
Tetrachloroethylene	04/22/2019	1.4	0.5	--	UG/L	152.50	

Table 10-4
OU III HFBR Tritium Plume Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 096-119 (EW-16)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	0	--	--	UG/L	100.00	

Site ID : 105-39 (EW-10)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	0	--	--	UG/L	140.00	

Site ID : 105-40 (EW-9)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	0	--	--	UG/L	140.00	

Site ID : 105-41 (EW-11)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/10/2019	0.52	--	--	UG/L	140.00	
Chloroform	04/10/2019	0.52	0.5	--	UG/L	140.00	

Section 11

Q2-2019 Operations Summary
OU III Western South Boundary Pump & Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to the Western South Boundary recharge basin

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells in OU III within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: September 2002

Table 11-1
OU III Western South Boundary Pump & Treat System
Pumping Rates (gpm)

Extraction Well	WSB-1	WSB-2	WSB-3	WSB-4	WSB-5	WSB-6
Site ID #	126-12	127-05	111-17	119-13	130-12	130-13
Screen Interval (ft bls)	140-160	150-170	168-188	170-190	160-190	196-216
Desired Flow Rate (GPM)	180	150	75	75	75	75
April	113	0	80	84	80	77
May	133	0	82	100	81	81
June	139	0	82	105	77	82
Actual (Avg. over Qtr.)	**128**	**0**	**81**	**96**	**79**	**80**

Extraction well WSB-2 is in standby mode. Extraction wells WSB-3 through WSB-6 became operational in March 2019.

Figure 11-1
OU III Western South Boundary Pump & Treat System
Cumulative Mass Removal of VOCs vs. Time

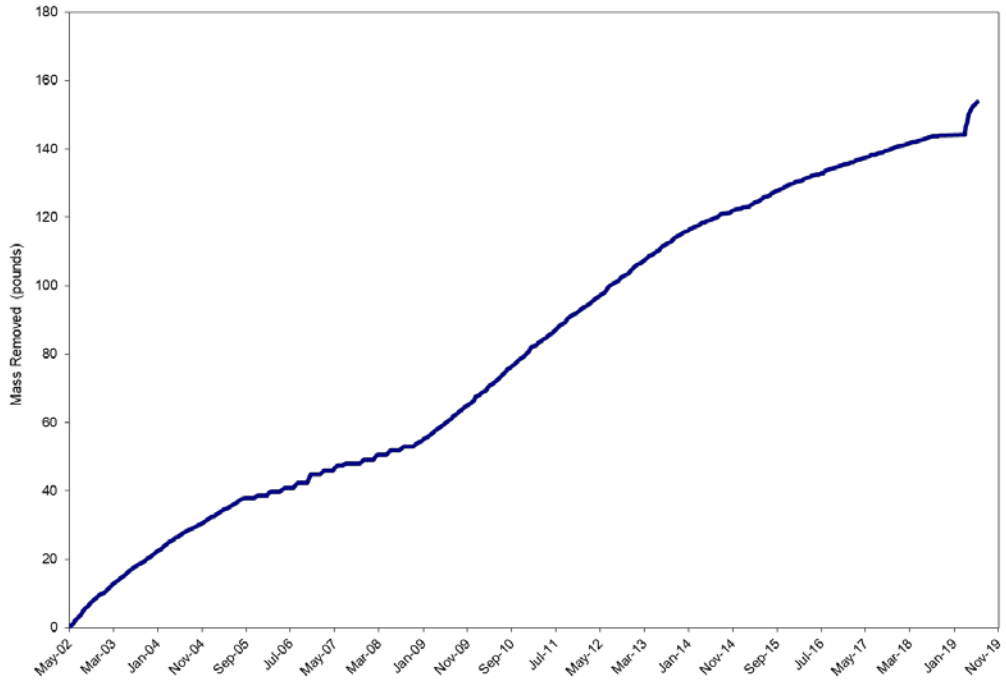
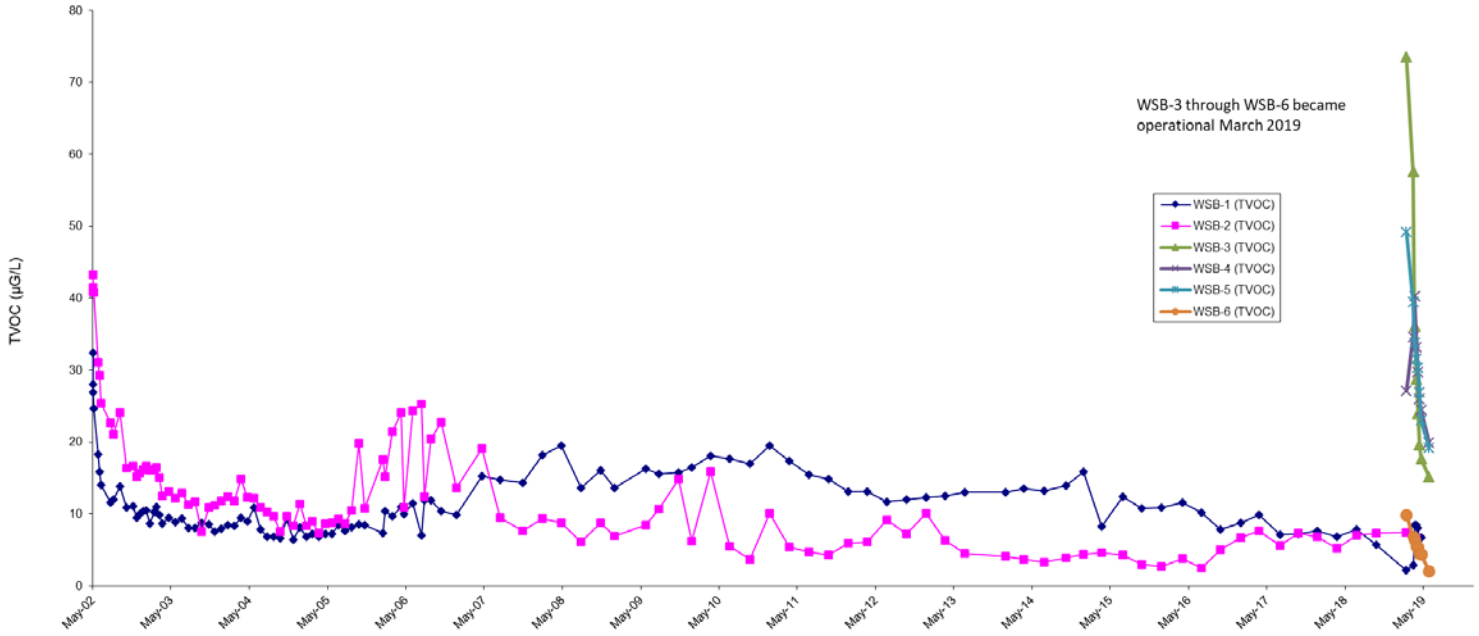


Figure 11-2
OU III Western South Boundary Pump & Treat System
Influent TVOC



Concentrations vs. Time

Table 11-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1, 2019 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**676,838** [1]	**GPD**	**Continuous**
pH (range)	**6.5 - 8.5**	**6.9 – 7.4**	**SU**	**Monthly**
Carbon Tetrachloride	**5**	**<0.50**	**ug/L**	**2/Month**
Chloroform	**7**	**<0.50**	**ug/L**	**2/Month**
Dichlorodifluoromethane	**5**	**<0.50**	**ug/L**	**2/Month**
1,1-Dichloroethane	**5**	**<0.50**	**ug/L**	**2/Month**
1,1-Dichloroethylene	**5**	**<0.50**	**ug/L**	**2/Month**
Methyl Chloride	**5**	**<0.50**	**ug/L**	**2/Month**
Tetrachloroethylene	**5**	**<0.50**	**ug/L**	**2/Month**
Toluene	**5**	**<0.50**	**ug/L**	**2/Month**
1,1,1-Trichloroethane	**5**	**<0.50**	**ug/L**	**2/Month**
1,1,2-Tricholorethane	**5**	**<0.50**	**ug/L**	**2/Month**
Trichloroethylene	**10**	**<0.50**	**ug/L**	**2/Month**

[1] The average flow for the operational period at the influent flow meter.
Note: As of March 2019, the water from the Western South Boundary is treated at the OU III South Boundary/Middle Road air stripper towers and discharged under that equivalency permit. This change in discharge location was reflected starting with the April DMR.

System Operations

April 2019:

Extraction well WSB-1, WSB-3, WSB-4, WSB-5, WSB-6 were running normally. Extraction well WSB-2 was in standby mode. The system treated approximately 18.5 million gallons of water.

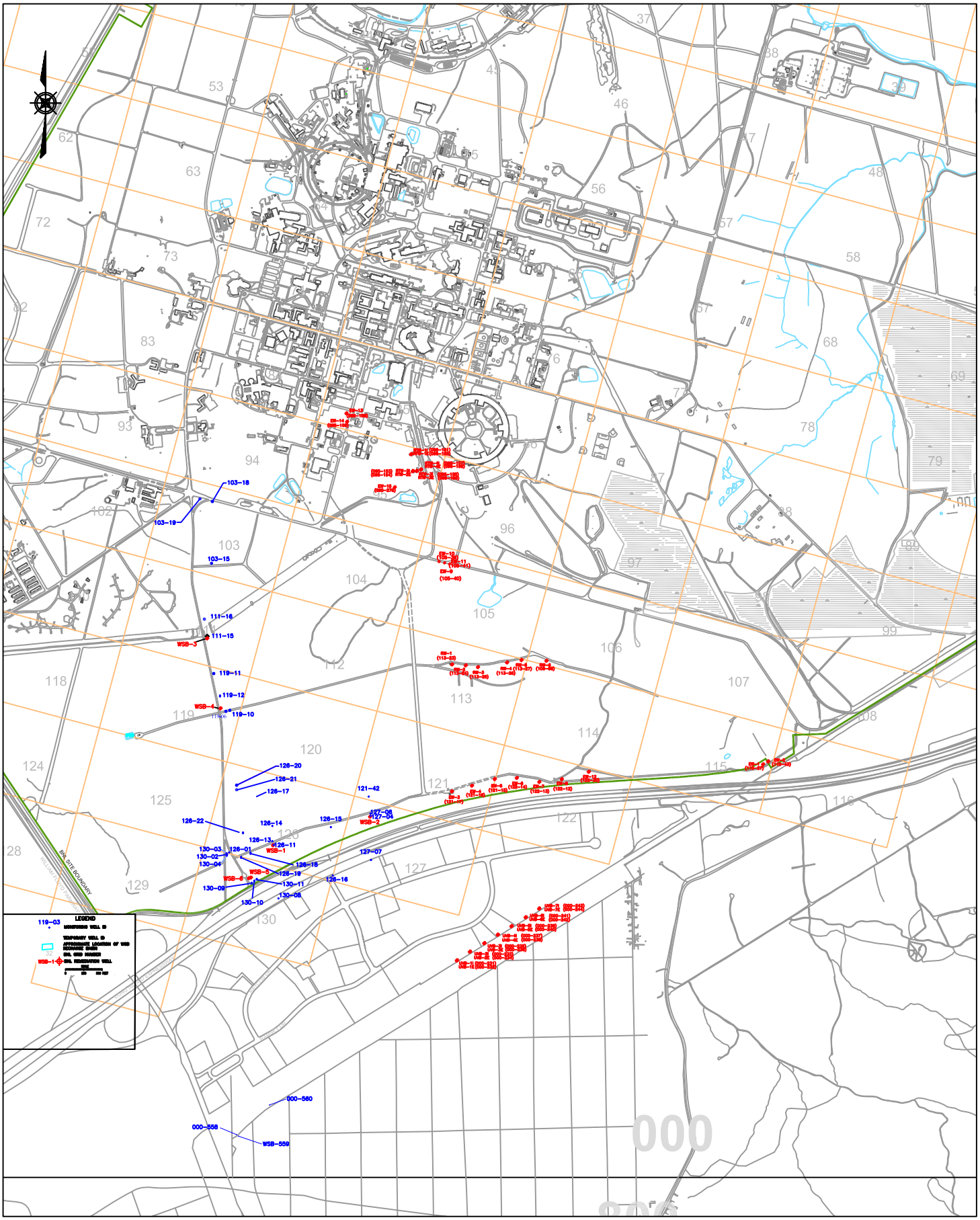
May 2019:
Extraction well WSB-1, WSB-3, WSB-4, WSB-5, WSB-6 were running normally. Extraction well WSB-2 was in standby mode. The system treated approximately 20.5 million gallons of water.

June 2019:
Extraction well WSB-1, WSB-3, WSB-4, WSB-5, WSB-6 were running normally. Extraction well WSB-2 was in standby mode. The system treated approximately 21 million gallons of water.

The system treated approximately 60 million gallons of water during the second quarter of 2019.

Planned Operational Changes

- Continue full-time operation of extraction well WSB-1 based on elevated concentrations persisting at well 126-14.
- Continue full time operation of extraction wells WSB-3 through WSB-6.
- Based on the low TVOC concentrations below the capture goal of 20 µg/L, maintain extraction well WSB-2 in standby mode. If TVOC concentrations greater than 20 µg/L are observed in WSB-2 or the adjacent core monitoring wells, extraction well WSB-2 may be put into full time operation. During the second quarter, WSB-2 and adjacent monitoring wells were below the TVOC capture goal of 20 µg/L.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

OU III WESTERN SOUTH BOUNDARY PUMP AND TREAT SYSTEM MONITORING WELL LOCATIONS

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	09/26/05	–
CHKD:	APPD:	REV.:	NOTES:
BH	--	10/1/19	–

FIGURE NO.: 11-3

Table 11-3
OU III Western South Boundary Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-558

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/02/2019	2.9	0.5	--	UG/L	165.00	
1,1-Dichloroethane	05/02/2019	0.9	0.5	--	UG/L	165.00	
1,1-Dichloroethylene	05/02/2019	3.6	0.5	--	UG/L	165.00	
524.2 TVOC	05/02/2019	18.6	--	--	UG/L	165.00	
Chloroform	05/02/2019	4.8	0.5	--	UG/L	165.00	
Dichlorodifluoromethane	05/02/2019	2.4	0.5	--	UG/L	165.00	
Trichloroethylene	05/02/2019	4	0.5	--	UG/L	165.00	

Site ID : 000-559

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/02/2019	0.67	--	--	UG/L	215.00	
Dichlorodifluoromethane	05/02/2019	0.67	0.5	--	UG/L	215.00	

Site ID : 000-560

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/02/2019	1.7	0.5	--	UG/L	159.50	
1,1-Dichloroethane	05/02/2019	0.69	0.5	--	UG/L	159.50	
1,1-Dichloroethylene	05/02/2019	2.8	0.5	--	UG/L	159.50	
524.2 TVOC	05/02/2019	12.09	--	--	UG/L	159.50	
Chloroform	05/02/2019	2	0.5	--	UG/L	159.50	
Dichlorodifluoromethane	05/02/2019	3.8	0.5	--	UG/L	159.50	
Trichloroethylene	05/02/2019	1.1	0.5	--	UG/L	159.50	

Site ID : 103-15

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	04/26/2019	5	0.5	--	UG/L	200.00	
1,1-Dichloroethylene	04/26/2019	4.8	0.5	--	UG/L	200.00	
524.2 TVOC	04/26/2019	25.9	--	--	UG/L	200.00	
Dichlorodifluoromethane	04/26/2019	11	0.5	--	UG/L	200.00	
Trichloroethylene	04/26/2019	5.1	0.5	--	UG/L	200.00	

Site ID : 103-18

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	04/30/2019	1.6	0.5	--	UG/L	170.00	
1,1-Dichloroethylene	04/30/2019	2.5	2.5	--	UG/L	170.00	
524.2 TVOC	04/30/2019	15.6	--	--	UG/L	170.00	
Dichlorodifluoromethane	04/30/2019	7.8	0.5	--	UG/L	170.00	
Tetrachloroethylene	04/30/2019	0.3	0.5	--	UG/L	170.00	J
Trichloroethylene	04/30/2019	3.4	0.5	--	UG/L	170.00	

Site ID : 103-19

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethane	05/01/2019	1.3	0.5	--	UG/L	170.00	
1,1-Dichloroethylene	05/01/2019	1.5	1.5	--	UG/L	170.00	
524.2 TVOC	05/01/2019	10.37	--	--	UG/L	170.00	
cis-1,2-Dichloroethylene	05/01/2019	0.17	0.5	--	UG/L	170.00	J
Dichlorodifluoromethane	05/01/2019	3.9	0.5	--	UG/L	170.00	
Trichloroethylene	05/01/2019	3.5	0.5	--	UG/L	170.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 111-15

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/26/2019	0.74	0.5	--	UG/L	175.00	
1,1-Dichloroethylene	04/26/2019	1.7	0.5	--	UG/L	175.00	
524.2 TVOC	04/26/2019	3.1	--	--	UG/L	175.00	
Trichloroethylene	04/26/2019	0.66	0.5	--	UG/L	175.00	

Site ID : 111-16

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/30/2019	1.4	1.4	--	UG/L	173.00	
1,1-Dichloroethane	04/30/2019	1.6	0.5	--	UG/L	173.00	
1,1-Dichloroethylene	04/30/2019	4	4	--	UG/L	173.00	
524.2 TVOC	04/30/2019	9.64	--	--	UG/L	173.00	
Chloroform	04/30/2019	0.5	0.5	--	UG/L	173.00	J
Dichlorodifluoromethane	04/30/2019	0.82	0.82	--	UG/L	173.00	
Tetrachloroethylene	04/30/2019	0.38	0.5	--	UG/L	173.00	J
Trichloroethylene	04/30/2019	0.94	0.5	--	UG/L	173.00	

Site ID : 119-06

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/25/2019	2.3	0.5	--	UG/L	130.00	
1,1-Dichloroethylene	04/25/2019	4.3	0.5	--	UG/L	130.00	
524.2 TVOC	04/25/2019	6.6	--	--	UG/L	130.00	

Site ID : 119-10

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/25/2019	0.67	0.5	--	UG/L	200.00	
1,1-Dichloroethane	04/25/2019	3.1	0.5	--	UG/L	200.00	
1,1-Dichloroethylene	04/25/2019	3	0.5	--	UG/L	200.00	
524.2 TVOC	04/25/2019	13.67	--	--	UG/L	200.00	
Dichlorodifluoromethane	04/25/2019	4.9	0.5	--	UG/L	200.00	
Trichloroethylene	04/25/2019	2	0.5	--	UG/L	200.00	

Site ID : 119-11

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	04/30/2019	46	46	--	UG/L	180.00	

Site ID : 119-12

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/30/2019	1.1	1.1	--	UG/L	179.00	
1,1-Dichloroethane	04/30/2019	2.4	0.5	--	UG/L	179.00	
1,1-Dichloroethylene	04/30/2019	3.9	3.9	--	UG/L	179.00	
524.2 TVOC	04/30/2019	13	--	--	UG/L	179.00	
Chloroform	04/30/2019	0.5	0.5	--	UG/L	179.00	J
Dichlorodifluoromethane	04/30/2019	1.1	1.1	--	UG/L	179.00	
Trichloroethylene	04/30/2019	4	0.5	--	UG/L	179.00	

Site ID : 121-55

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/01/2019	5.3	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/01/2019	1.1	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/01/2019	10	0.5	--	UG/L	0.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
"Hits Only" - April through June 2019

524.2 TVOC	04/01/2019	23.9	--	--	UG/L	0.00	
Chloroform	04/01/2019	1.5	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/01/2019	4.4	0.5	--	UG/L	0.00	
Perfluorobutanesulfonate (PFBS)	04/01/2019	1.03	1.57	--	NG/L	0.00	J
Perfluorobutyric acid (PFBA)	04/01/2019	5.47	1.76	--	NG/L	0.00	
Perfluorohexanesulfonate (PFHxS)	04/01/2019	3.75	1.6	--	NG/L	0.00	
Perfluorohexanoic acid (PFHxA)	04/01/2019	0.701	1.76	--	NG/L	0.00	J
Perfluorooctanesulfonate (PFOS)	04/01/2019	2.16	1.76	--	NG/L	0.00	
Perfluorooctanoic acid (PFOA)	04/01/2019	1.26	1.76	--	NG/L	0.00	J
Perfluoropentanesulfonate (PFPeS)	04/01/2019	0.633	1.65	--	NG/L	0.00	J
Trichloroethylene	04/01/2019	1.6	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/09/2019	4.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/09/2019	0.98	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	8.9	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	21.78	--	--	UG/L	0.00	
Chloroform	04/09/2019	1.5	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/09/2019	4.3	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	1.5	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/16/2019	4.2	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/16/2019	0.9	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/16/2019	8	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	19.8	--	--	UG/L	0.00	
Chloroform	04/16/2019	1.4	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/16/2019	3.8	0.5	--	UG/L	0.00	
Trichloroethylene	04/16/2019	1.5	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/23/2019	3.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/23/2019	0.8	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/23/2019	6.8	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	17.1	--	--	UG/L	0.00	
Chloroform	04/23/2019	1.4	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/23/2019	3.1	0.5	--	UG/L	0.00	
Trichloroethylene	04/23/2019	1.4	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/01/2019	3.2	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/01/2019	0.68	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	05/01/2019	5.7	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	14.58	--	--	UG/L	0.00	
Chloroform	05/01/2019	1.3	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	05/01/2019	2.4	0.5	--	UG/L	0.00	
Trichloroethylene	05/01/2019	1.3	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/14/2019	2.9	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/14/2019	0.63	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	05/14/2019	5.2	0.5	--	UG/L	0.00	
524.2 TVOC	05/14/2019	13.23	--	--	UG/L	0.00	
Chloroform	05/14/2019	1.2	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	05/14/2019	2.2	0.5	--	UG/L	0.00	
Trichloroethylene	05/14/2019	1.1	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/06/2019	3	0.5	--	UG/L	0.00	
1,1-Dichloroethane	06/06/2019	0.6	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	06/06/2019	4.8	0.5	--	UG/L	0.00	
524.2 TVOC	06/06/2019	11.7	--	--	UG/L	0.00	
Chloroform	06/06/2019	1.2	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	06/06/2019	1.1	0.5	--	UG/L	0.00	
Trichloroethylene	06/06/2019	1	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/19/2019	3.1	0.5	--	UG/L	0.00	
1,1-Dichloroethane	06/19/2019	0.57	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	06/19/2019	4.7	0.5	--	UG/L	0.00	
524.2 TVOC	06/19/2019	11.63	--	--	UG/L	0.00	
Chloroform	06/19/2019	1.2	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	06/19/2019	1.1	0.5	--	UG/L	0.00	
Trichloroethylene	06/19/2019	0.96	0.5	--	UG/L	0.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
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Site ID : 126-11

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/29/2019	0	--	--	UG/L	155.00	

Site ID : 126-14

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	61	61	--	UG/L	155.00	
1,1-Dichloroethylene	04/29/2019	72	72	--	UG/L	155.00	

Site ID : 126-16

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/03/2019	1.9	0.5	--	UG/L	135.00	
1,1-Dichloroethane	05/03/2019	1	0.5	--	UG/L	135.00	
1,1-Dichloroethylene	05/03/2019	2.8	0.5	--	UG/L	135.00	
524.2 TVOC	05/03/2019	16	--	--	UG/L	135.00	
Chloroform	05/03/2019	3	0.5	--	UG/L	135.00	
Dichlorodifluoromethane	05/03/2019	4.4	0.5	--	UG/L	135.00	
Trichloroethylene	05/03/2019	2.9	0.5	--	UG/L	135.00	

Site ID : 126-17

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	0.5	0.5	--	UG/L	140.00	J
1,1-Dichloroethylene	04/29/2019	0.5	0.5	--	UG/L	140.00	J
524.2 TVOC	04/29/2019	1	--	--	UG/L	140.00	

Site ID : 126-18

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	38	38	--	UG/L	165.00	
1,1-Dichloroethylene	04/29/2019	49	49	--	UG/L	165.00	

Site ID : 126-19

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	1.3	1.3	--	UG/L	195.00	
1,1-Dichloroethane	04/29/2019	1.4	0.5	--	UG/L	195.00	
1,1-Dichloroethylene	04/29/2019	3.4	3.4	--	UG/L	195.00	
524.2 TVOC	04/29/2019	43.96	--	--	UG/L	195.00	
524.2 TVOC	04/29/2019	4.76	--	--	UG/L	0.00	
Chlorobenzene	04/29/2019	0.16	0.5	--	UG/L	0.00	J
Chloroform	04/29/2019	0.86	0.86	--	UG/L	195.00	
Dichlorodifluoromethane	04/29/2019	37	0.5	--	UG/L	195.00	
Methylene chloride	04/29/2019	4.6	0.5	--	UG/L	0.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
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Site ID : 126-20

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	29	0.5	--	UG/L	140.00	
1,1-Dichloroethane	04/29/2019	0.5	0.5	--	UG/L	140.00	J
1,1-Dichloroethylene	04/29/2019	36	0.5	--	UG/L	140.00	
1,2-Dichloroethane	04/29/2019	0.5	0.5	--	UG/L	140.00	
524.2 TVOC	04/29/2019	69.17	--	--	UG/L	140.00	
Chloroform	04/29/2019	1.2	1.2	--	UG/L	140.00	
Tetrachloroethylene	04/29/2019	0.57	0.5	--	UG/L	140.00	
Trichloroethylene	04/29/2019	1.4	0.5	--	UG/L	140.00	

Site ID : 126-21

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	1.9	0.5	--	UG/L	204.00	
1,1-Dichloroethane	04/29/2019	0.24	0.5	--	UG/L	204.00	J
1,1-Dichloroethylene	04/29/2019	3.3	0.5	--	UG/L	204.00	
524.2 TVOC	04/29/2019	6.29	--	--	UG/L	204.00	
Chloroform	04/29/2019	0.48	0.5	--	UG/L	204.00	J
Dichlorodifluoromethane	04/29/2019	0.37	0.5	--	UG/L	204.00	J

Site ID : 126-22

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/01/2019	0.5	0.5	--	UG/L	208.00	J
1,1-Dichloroethane	05/01/2019	0.5	0.5	--	UG/L	208.00	J
1,1-Dichloroethylene	05/01/2019	0.5	0.5	--	UG/L	208.00	J
524.2 TVOC	05/01/2019	17.5	--	--	UG/L	208.00	
Dichlorodifluoromethane	05/01/2019	16	0.5	--	UG/L	208.00	

Site ID : 127-04

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/29/2019	0.6	0.6	--	UG/L	155.00	
1,1-Dichloroethane	04/29/2019	0.5	0.5	--	UG/L	155.00	J
1,1-Dichloroethylene	04/29/2019	0.68	0.68	--	UG/L	155.00	
524.2 TVOC	04/29/2019	4.71	--	--	UG/L	155.00	
Chloroform	04/29/2019	0.62	0.62	--	UG/L	155.00	
Dichlorodifluoromethane	04/29/2019	0.62	0.62	--	UG/L	155.00	
Tetrachloroethylene	04/29/2019	0.29	0.5	--	UG/L	155.00	J
Trichloroethylene	04/29/2019	1.4	0.5	--	UG/L	155.00	

Site ID : 127-07

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/03/2019	0	--	--	UG/L	151.00	

Site ID : 130-08

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/03/2019	0	--	--	UG/L	150.00	

Table 11-3
OU III Western South Boundary Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 130-09

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	05/03/2019	0.51	0.5	--	UG/L	140.00	
524.2 TVOC	05/03/2019	1.09	--	--	UG/L	140.00	
Chloroform	05/03/2019	0.58	0.5	--	UG/L	140.00	

Site ID : 130-10

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/03/2019	19	0.5	--	UG/L	155.00	
1,1-Dichloroethylene	05/03/2019	21	0.5	--	UG/L	155.00	
524.2 TVOC	05/03/2019	42.4	--	--	UG/L	155.00	
Chloroform	05/03/2019	1.3	0.5	--	UG/L	155.00	
Trichloroethylene	05/03/2019	1.1	0.5	--	UG/L	155.00	

Site ID : 130-11

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/03/2019	6.85	--	--	UG/L	200.00	
Chloroform	05/03/2019	0.55	0.5	--	UG/L	200.00	
Dichlorodifluoromethane	05/03/2019	6.3	0.5	--	UG/L	200.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Table 11-4
OU III Western South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 111-17 (WSB-3)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/01/2019	8.9	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/01/2019	2.9	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/01/2019	22	0.5	--	UG/L	0.00	
524.2 TVOC	04/01/2019	36.17	--	--	UG/L	0.00	
Chloroform	04/01/2019	0.67	0.5	--	UG/L	0.00	
Trichloroethylene	04/01/2019	1.7	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/09/2019	7.1	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/09/2019	2.3	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	17	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	28.78	--	--	UG/L	0.00	
Chloroform	04/09/2019	0.78	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	1.6	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/16/2019	6.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/16/2019	2	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/16/2019	13	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	23.95	--	--	UG/L	0.00	
Chloroform	04/16/2019	0.85	0.5	--	UG/L	0.00	
Trichloroethylene	04/16/2019	1.5	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/23/2019	5.6	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/23/2019	1.8	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/23/2019	10	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	19.63	--	--	UG/L	0.00	
Chloroform	04/23/2019	0.83	0.5	--	UG/L	0.00	
Trichloroethylene	04/23/2019	1.4	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/01/2019	4.8	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/01/2019	1.6	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	05/01/2019	9.3	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	17.66	--	--	UG/L	0.00	
Chloroform	05/01/2019	0.76	0.5	--	UG/L	0.00	
Trichloroethylene	05/01/2019	1.2	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/06/2019	4	0.5	--	UG/L	0.00	
1,1-Dichloroethane	06/06/2019	1.4	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	06/06/2019	8	0.5	--	UG/L	0.00	
524.2 TVOC	06/06/2019	15.19	--	--	UG/L	0.00	
Chloroform	06/06/2019	0.69	0.5	--	UG/L	0.00	
Trichloroethylene	06/06/2019	1.1	0.5	--	UG/L	0.00	

Table 11-4
OU III Western South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 119-13 (WSB-4)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/01/2019	12	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/01/2019	1.5	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/01/2019	21	0.5	--	UG/L	0.00	
524.2 TVOC	04/01/2019	40.3	--	--	UG/L	0.00	
Chloroform	04/01/2019	1.5	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/01/2019	1.3	0.5	--	UG/L	0.00	
Trichloroethylene	04/01/2019	3	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/09/2019	9.8	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/09/2019	1.3	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	17	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	33.2	--	--	UG/L	0.00	
Chloroform	04/09/2019	1.4	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/09/2019	1.1	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	2.6	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/16/2019	8.8	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/16/2019	1.2	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/16/2019	15	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	29.7	--	--	UG/L	0.00	
Chloroform	04/16/2019	1.3	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/16/2019	1	0.5	--	UG/L	0.00	
Trichloroethylene	04/16/2019	2.4	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/23/2019	7.7	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/23/2019	1.1	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/23/2019	13	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	25.98	--	--	UG/L	0.00	
Chloroform	04/23/2019	1.2	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/23/2019	0.88	0.5	--	UG/L	0.00	
Trichloroethylene	04/23/2019	2.1	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/01/2019	7.5	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/01/2019	0.97	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	05/01/2019	12	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	24.49	--	--	UG/L	0.00	
Chloroform	05/01/2019	1.1	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	05/01/2019	0.82	0.5	--	UG/L	0.00	
Trichloroethylene	05/01/2019	2.1	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/06/2019	6.8	0.5	--	UG/L	0.00	
1,1-Dichloroethane	06/06/2019	0.87	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	06/06/2019	9.9	0.5	--	UG/L	0.00	
524.2 TVOC	06/06/2019	19.94	--	--	UG/L	0.00	
Chloroform	06/06/2019	0.87	0.5	--	UG/L	0.00	
Trichloroethylene	06/06/2019	1.5	0.5	--	UG/L	0.00	

Table 11-4
OU III Western South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 126-12 (WSB-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/01/2019	3	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/01/2019	4.3	0.5	--	UG/L	0.00	
524.2 TVOC	04/01/2019	8.46	--	--	UG/L	0.00	
Chloroform	04/01/2019	0.5	0.5	--	UG/L	0.00	
Trichloroethylene	04/01/2019	0.66	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/09/2019	3	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	4.2	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	8.49	--	--	UG/L	0.00	
Chloroform	04/09/2019	0.59	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	0.7	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/16/2019	2.7	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/16/2019	4	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	8.07	--	--	UG/L	0.00	
Chloroform	04/16/2019	0.63	0.5	--	UG/L	0.00	
Trichloroethylene	04/16/2019	0.74	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/23/2019	2.2	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/23/2019	3.1	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	6.62	--	--	UG/L	0.00	
Chloroform	04/23/2019	0.62	0.5	--	UG/L	0.00	
Trichloroethylene	04/23/2019	0.7	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/01/2019	2.2	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/01/2019	0.17	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	05/01/2019	3	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	6.78	--	--	UG/L	0.00	
Chloroform	05/01/2019	0.69	0.5	--	UG/L	0.00	
Trichloroethylene	05/01/2019	0.72	0.5	--	UG/L	0.00	

Site ID : 127-05 (WSB-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/09/2019	1	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	1.2	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	6.57	--	--	UG/L	0.00	
Chloroform	04/09/2019	1.1	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/09/2019	0.87	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	2.4	0.5	--	UG/L	0.00	

Table 11-4
OU III Western South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 130-12 (WSB-5)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/01/2019	3	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/01/2019	1.2	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/01/2019	3.7	0.5	--	UG/L	0.00	
524.2 TVOC	04/01/2019	33.8	--	--	UG/L	0.00	
Chloroform	04/01/2019	5.7	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/01/2019	17	0.5	--	UG/L	0.00	
Trichloroethylene	04/01/2019	3.2	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/09/2019	3.4	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/09/2019	1.2	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	4.3	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	31.6	--	--	UG/L	0.00	
Chloroform	04/09/2019	5.5	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/09/2019	14	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	3.2	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/16/2019	3.5	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/16/2019	1.1	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/16/2019	4.3	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	30.4	--	--	UG/L	0.00	
Chloroform	04/16/2019	5.3	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/16/2019	13	0.5	--	UG/L	0.00	
Trichloroethylene	04/16/2019	3.2	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/23/2019	3.2	0.5	--	UG/L	0.00	
1,1-Dichloroethane	04/23/2019	0.98	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/23/2019	4.1	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	26.88	--	--	UG/L	0.00	
Chloroform	04/23/2019	4.8	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	04/23/2019	11	0.5	--	UG/L	0.00	
Trichloroethylene	04/23/2019	2.8	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/01/2019	3.1	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/01/2019	0.93	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	05/01/2019	3.6	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	23.03	--	--	UG/L	0.00	
Chloroform	05/01/2019	4.6	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	05/01/2019	8.2	0.5	--	UG/L	0.00	
Trichloroethylene	05/01/2019	2.6	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	06/06/2019	4.7	0.5	--	UG/L	0.00	
1,1-Dichloroethane	06/06/2019	0.83	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	06/06/2019	2.7	0.5	--	UG/L	0.00	
524.2 TVOC	06/06/2019	19.23	--	--	UG/L	0.00	
Chloroform	06/06/2019	4.1	0.5	--	UG/L	0.00	
Dichlorodifluoromethane	06/06/2019	4.5	0.5	--	UG/L	0.00	
Trichloroethylene	06/06/2019	2.4	0.5	--	UG/L	0.00	

Table 11-4
OU III Western South Boundary Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 130-13 (WSB-6)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/01/2019	6.3	--	--	UG/L	0.00	
Dichlorodifluoromethane	04/01/2019	6.3	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	5.5	--	--	UG/L	0.00	
Dichlorodifluoromethane	04/09/2019	5.5	0.5	--	UG/L	0.00	
524.2 TVOC	04/16/2019	5.4	--	--	UG/L	0.00	
Dichlorodifluoromethane	04/16/2019	5.4	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	4.5	--	--	UG/L	0.00	
Dichlorodifluoromethane	04/23/2019	4.5	0.5	--	UG/L	0.00	
1,1-Dichloroethane	05/01/2019	0.23	0.5	--	UG/L	0.00	J
1,1-Dichloroethylene	05/01/2019	0.16	0.5	--	UG/L	0.00	J
524.2 TVOC	05/01/2019	4.39	--	--	UG/L	0.00	
Dichlorodifluoromethane	05/01/2019	4	0.5	--	UG/L	0.00	
524.2 TVOC	06/06/2019	2.1	--	--	UG/L	0.00	
Dichlorodifluoromethane	06/06/2019	2.1	0.5	--	UG/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Section 12
Q2-2019 Operations Summary
OU III Strontium-90 Chemical Holes Treatment System

Process: Groundwater extraction and treatment via zeolite resin (Clinoptilolite) for the removal of Sr-90, with discharge to dry wells.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 40 years for the Upper Glacial aquifer (by 2040).

Start Date: February 2003

Table 12-1
OU III Sr-90 Chemical Holes
Pumping Rates (gpm)

Site Id #	106-92	106-123	106-124
Screen Interval (ft bls)	23.5-38.5	35-45	35-45
Desired Flow Rate (gpm)	0.0	0.0	0.0
April (Avg monthly gpm)	0.0	0.0	0.0
May	0.0	0.0	0.0
June	0.0	0.0	0.0
Actual (Avg. over Qtr. when on)	0.0	0.0	0.0

***** All three extraction wells began pulse pumping (one month on and two months off) in October 2014. In October 2015, EW-1 began full time operation. In April 2016, EW-1 was placed into pulsed pumping mode (one month on and one month off). In October 2016, EW-2 and EW-3 were placed in stand-by mode while EW-1 continued in pulsed pumping mode. EW-1 was placed in stand-by mode in July 2018.

Figure 12-1
Chemical Holes Strontium-90 Cumulative Millicuries Removed

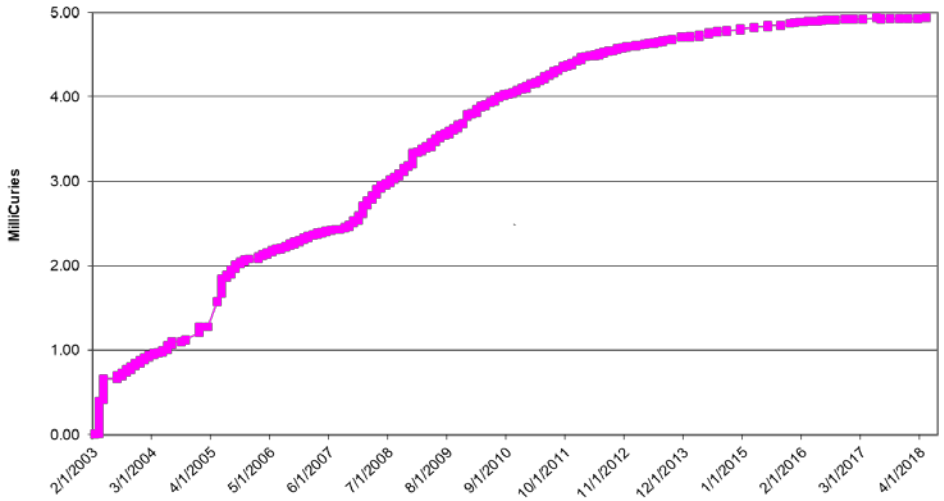


Figure 12-2
Chemical Holes Influent Strontium-90 Concentrations

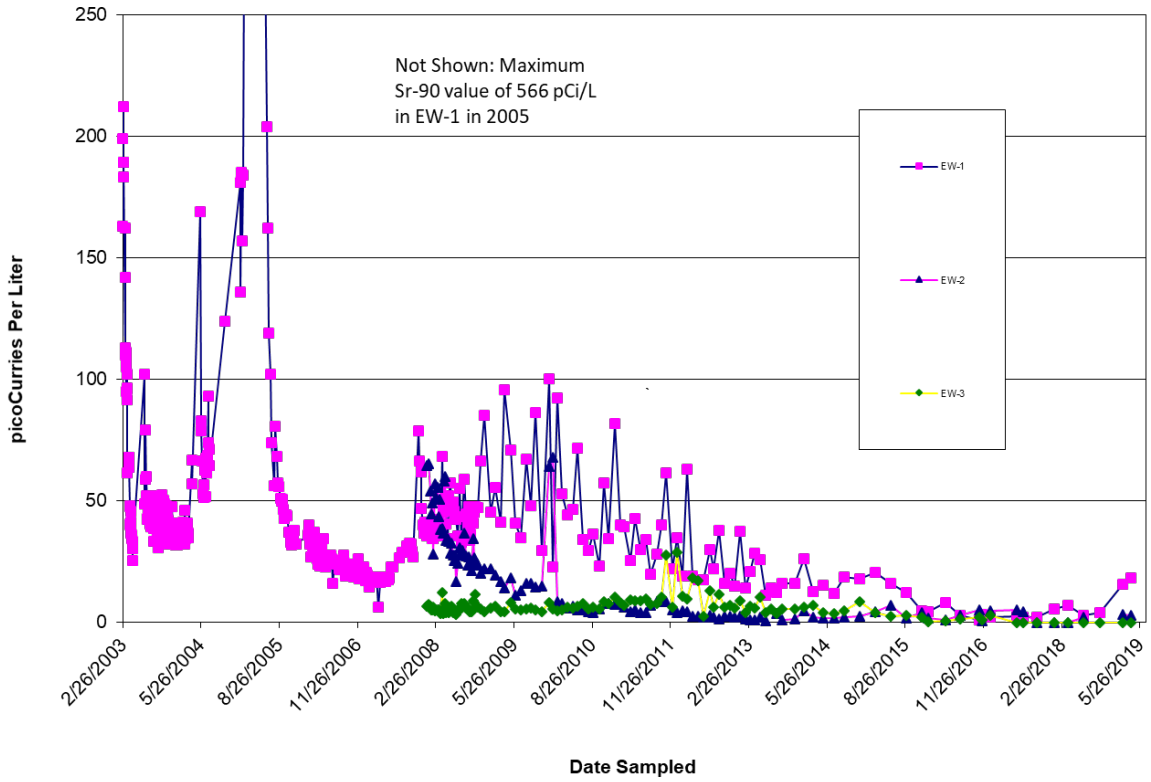


Table 12-2
OU III Sr-90 Chemical Holes Treatment System Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	**NA**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**NA**	**SU**	**Monthly**
Sr-90	**8**	**NA**	**pCi/L**	**Monthly**

NA = Not Applicable. The system was shut down in July 2018.
ND = Not Detected.

Systems Operations

April 2019:

The system was in stand-by mode.

May 2019:

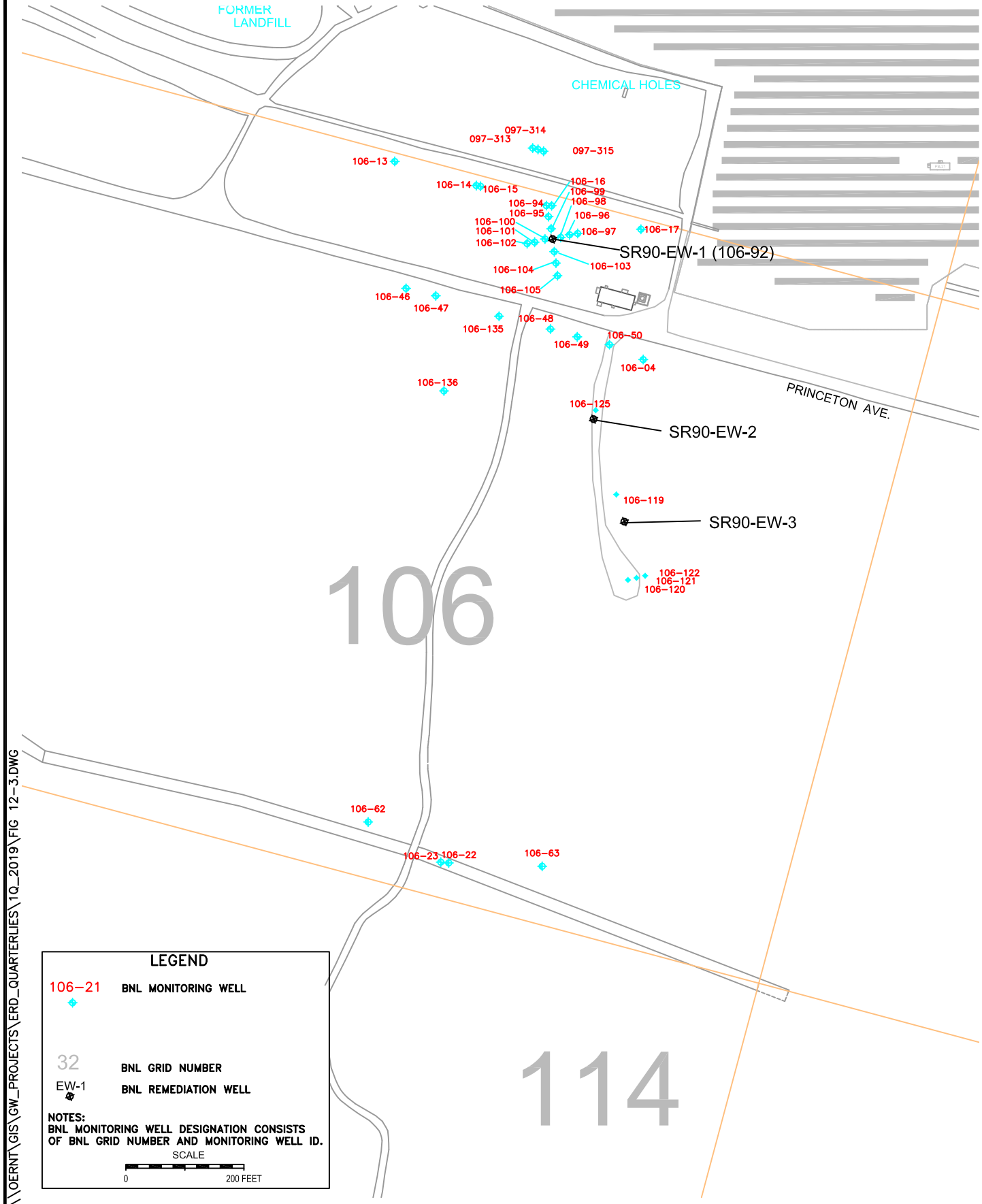
The system was in stand-by mode.

June 2019:

The system was in stand-by mode.

Planned Operational Changes

- Maintain the system in stand-by mode. If significant rebound is identified, these extraction wells may be restarted. During the second quarter, Sr-90 concentrations in the extraction wells remained low. The monitoring wells were not scheduled to be sampled in the second quarter.



BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL PROTECTION DIVISION

TITLE:

CHEMICAL HOLES
Sr-90 MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	07/15/08	–
CHKD:	APPD:	REV.:	NOTES:
RH	– –	08/22/19	–

FIGURE NO.: 12-3

Table 12-3
OU III Strontium-90 Chemical Holes Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 106-123 (EW-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/03/2019	2.74	0.768	0.67	PCI/L	0.00	
Strontium-90	04/03/2019	2.74	0.768	0.67	PCI/L	0.00	

Site ID : 106-92 (EW-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/03/2019	18.2	0.778	1.54	PCI/L	0.00	
Strontium-90	04/03/2019	18.2	0.778	1.54	PCI/L	0.00	

Section 13

Q2-2019 Operations Summary
OU III Former Industrial Park East Pump & Treat System
(System Closed)

The Petition for Closure for the OU III Industrial Park East Groundwater Treatment System was submitted to the regulators for review in May 2013. Approval was received from the regulators in June and July 2013 that the system met its treatment goals and can now be dismantled. Any remaining contaminants in the downgradient portion of the plume beyond the capture zone of the extraction wells will attenuate to below MCLs in the Upper Glacial and Magothy aquifers before the required 2030 and 2065 cleanup timeframes, respectively.

Dismantlement activities have been initiated including the abandonment of four groundwater monitoring wells (000-489, 000-493, 000-513, 000-514) and the two groundwater extraction wells (EWI-1 and EWI-2) in September 2013. Final decommissioning of the treatment system will be performed following the completion of remediation of the deep VOC contamination in the Industrial Park.

The building, carbon units, and the two recharge wells are being used with the two new extraction wells for remediation of the deep VOC contamination in the Industrial Park.

The post closure monitoring network consists of four wells. In accordance with the recommendation in the *2015 Groundwater Status Report*, VOC monitoring for seven wells was discontinued in the fourth quarter of 2016 since the wells have been below the AWQS for a minimum of four consecutive sampling events. The data from the four wells are also evaluated as part of the North Street and Magothy monitoring programs. Monitoring will continue until MCLs are achieved for a minimum of four consecutive sampling events. The monitoring schedule is described in the BNL Environmental Monitoring Plan (EMP).

Section 14

Q2-2019 Operations Summary
OU III North Street Pump & Treat System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells

Goal: Reach Maximum Contaminant Levels (MCLs) or asymptotic conditions in core monitoring wells within 30 years for the Upper Glacial aquifer and within 65 years for the Magothy aquifer (by 2030 and 2065, respectively).

Start Date: June 2004

Table 14-1
OU III North Street Pump & Treat System
Pumping Rates (gpm)

Extraction Well	NS-1	NS-2
Site ID #	000-471	000-473
Screen Interval (ft bls)	165-205	190-220
Design Flow Rate (GPM)	200	250
April	off	off
March	off	off
April	off	off
Actual (Avg. over Qtr.)	0	0

Notes: The system was shut down and placed in standby mode in 2013. NS-1 was temporarily restarted in 2014 due to increasing VOCs in nearby monitoring wells, and then shut down in June 2015. NS-1 was again restarted in August 2015. NS-2 was restarted September 2014 due to increasing VOCs in nearby monitoring wells, and then shut down in June 2015. The system was shut down and placed in standby mode August 2016.

Figure 14-1
OU III North Street Pump & Treat System
Cumulative Mass Removal of VOCs vs. Time

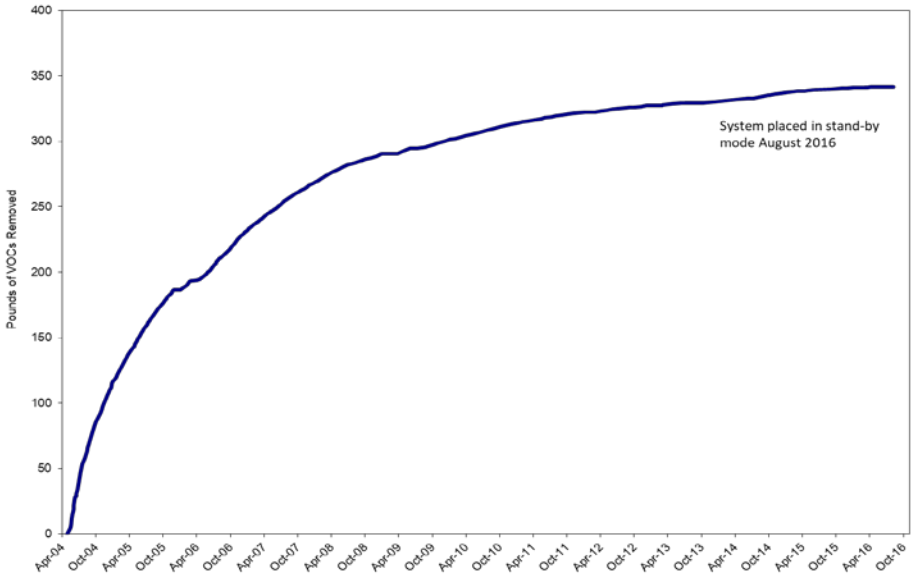


Figure 14-2
OU III North Street Pump & Treat System
Influent TVOC Concentrations vs. Time

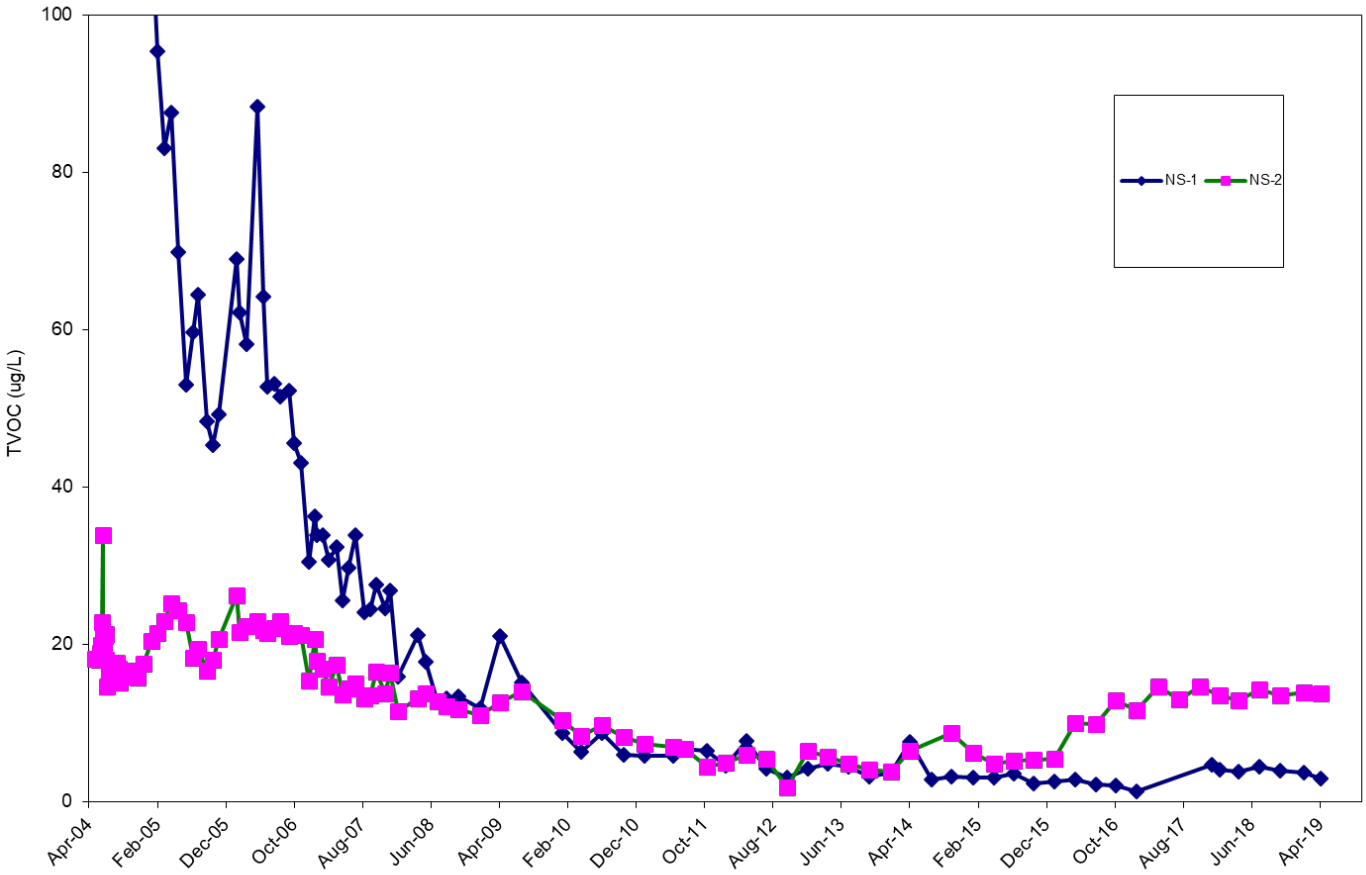


Table 14-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	**Monitor**	NA [1]	**GPD**	**Continuous**
pH (range)	**5.5 - 8.5**	NA	**SU**	**Monthly**
Carbon Tetrachloride	**5**	NA	**ug/L**	**Monthly**
Chloroform	**5**	NA	**ug/L**	**Monthly**
1,1-Dichloroethane	**5**	NA	**ug/L**	**Monthly**
1,2-Dichloroethane	**5**	NA	**ug/L**	**Monthly**
1,1-Dichloroethylene	**5**	NA	**ug/L**	**Monthly**
Tetrachloroethylene	**5**	NA	**ug/L**	**Monthly**
Toluene	**5**	NA	**ug/L**	**Monthly**
1,1,1-Trichloroethane	**5**	NA	**ug/L**	**Monthly**
Trichloroethylene	**10**	NA	**ug/L**	**Monthly**

[1] The system is in stand-by mode. [NA=] Not Applicable.

System Operations

April 2019:

NS-1 and NS-2 remained in standby mode.

May 2019:

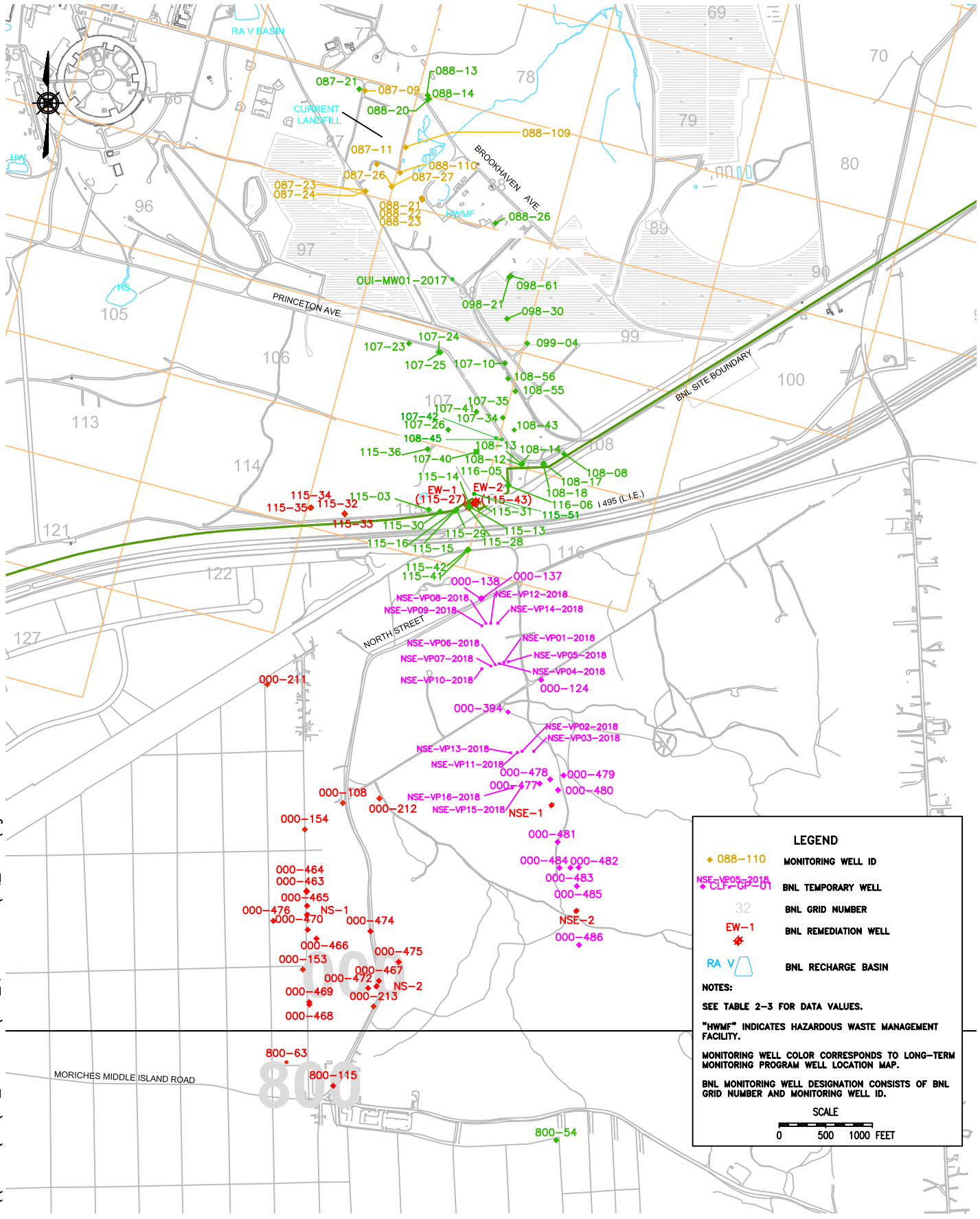
NS-1 and NS-2 remained in standby mode.

June 2019:

NS-1 and NS-2 remained in standby mode.

Planned Operational Changes

- NS-1 and NS-2 will remain in standby mode. Submit a Petition for Closure as this system has met its cleanup goal. During the second quarter of 2019, TVOC concentrations in extraction well NS-1 and NS-2 and the monitoring wells remained below 50 µg/L.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU I SOUTH BOUNDARY/NORTH STREET/NORTH STREET EAST MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	08/08/11	–
CHKD:	APPD:	REV.:	NOTES:
RH	--	10/1/19	–

FIGURE NO.: 14-3

Table 14-3
OU III North Street Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-108

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/07/2019	1.12	--	--	UG/L	220.00	
Chloroform	05/07/2019	0.53	0.5	--	UG/L	220.00	
Tetrachloroethylene	05/07/2019	0.59	0.5	--	UG/L	220.00	

Site ID : 000-153

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/07/2019	0	--	--	UG/L	200.00	

Site ID : 000-154

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/07/2019	0.95	--	--	UG/L	198.00	
Chloroform	05/07/2019	0.95	0.5	--	UG/L	198.00	

Site ID : 000-212

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/08/2019	1.91	--	--	UG/L	205.00	
524.2 TVOC	05/08/2019	0	--	--	UG/L	0.00	
Chloroform	05/08/2019	0.91	0.5	--	UG/L	205.00	
Tetrachloroethylene	05/08/2019	1	0.5	--	UG/L	205.00	

Site ID : 000-213

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/08/2019	9.8	0.5	--	UG/L	195.00	
1,1-Dichloroethylene	05/08/2019	4.5	0.5	--	UG/L	195.00	
524.2 TVOC	05/08/2019	22.2	--	--	UG/L	195.00	
Carbon tetrachloride	05/08/2019	0.8	0.5	--	UG/L	195.00	
Chloroform	05/08/2019	2.8	0.5	--	UG/L	195.00	
Tetrachloroethylene	05/08/2019	4.3	0.5	--	UG/L	195.00	

Site ID : 000-343

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/20/2019	1.2	0.5	--	UG/L	330.00	
1,1-Dichloroethane	05/20/2019	4.8	0.5	--	UG/L	330.00	
1,1-Dichloroethylene	05/20/2019	0.6	0.5	--	UG/L	330.00	
524.2 TVOC	05/20/2019	8.09	--	--	UG/L	330.00	
cis-1,2-Dichloroethylene	05/20/2019	0.96	0.5	--	UG/L	330.00	
Vinyl chloride	05/20/2019	0.53	0.5	--	UG/L	330.00	

Site ID : 000-463

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	0.89	--	--	UG/L	168.00	
Chloroform	05/06/2019	0.89	0.5	--	UG/L	168.00	

Table 14-3
OU III North Street Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-464

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	2.32	--	--	UG/L	188.00	
Carbon tetrachloride	05/06/2019	0.7	0.5	--	UG/L	188.00	
Chloroform	05/06/2019	0.87	0.5	--	UG/L	188.00	
Trichloroethylene	05/06/2019	0.75	0.5	--	UG/L	188.00	

Site ID : 000-465

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	2.82	--	--	UG/L	190.00	
Carbon tetrachloride	05/06/2019	1.1	0.5	--	UG/L	190.00	
Chloroform	05/06/2019	0.62	0.5	--	UG/L	190.00	
Trichloroethylene	05/06/2019	1.1	0.5	--	UG/L	190.00	

Site ID : 000-466

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/06/2019	0.76	0.5	--	UG/L	185.00	
1,1,2,2-Tetrachloroethane	05/06/2019	0.51	0.5	--	UG/L	185.00	
1,1-Dichloroethane	05/06/2019	1.4	0.5	--	UG/L	185.00	
524.2 TVOC	05/06/2019	5.37	--	--	UG/L	185.00	
Chloroform	05/06/2019	1.5	0.5	--	UG/L	185.00	
Trichloroethylene	05/06/2019	1.2	0.5	--	UG/L	185.00	

Site ID : 000-467

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/08/2019	1.8	0.5	--	UG/L	307.00	
1,1-Dichloroethylene	05/08/2019	0.76	0.5	--	UG/L	307.00	
524.2 TVOC	05/08/2019	4.32	--	--	UG/L	307.00	
Chloroform	05/08/2019	0.85	0.5	--	UG/L	307.00	
Tetrachloroethylene	05/08/2019	0.91	0.5	--	UG/L	307.00	

Site ID : 000-468

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	0.6	--	--	UG/L	172.00	
Chloroform	05/06/2019	0.6	0.5	--	UG/L	172.00	

Site ID : 000-470

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	3.67	--	--	UG/L	175.00	
Carbon tetrachloride	05/06/2019	1.6	0.5	--	UG/L	175.00	
Chloroform	05/06/2019	0.87	0.5	--	UG/L	175.00	
Trichloroethylene	05/06/2019	1.2	0.5	--	UG/L	175.00	

Site ID : 000-472

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/08/2019	2.8	0.5	--	UG/L	211.00	
1,1-Dichloroethylene	05/08/2019	1.6	0.5	--	UG/L	211.00	
524.2 TVOC	05/08/2019	16.44	--	--	UG/L	211.00	
Carbon tetrachloride	05/08/2019	0.74	0.5	--	UG/L	211.00	
Chloroform	05/08/2019	1.7	0.5	--	UG/L	211.00	
Tetrachloroethylene	05/08/2019	9.6	0.5	--	UG/L	211.00	

Table 14-3
OU III North Street Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-474

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/07/2019	2.1	0.5	--	UG/L	200.00	
1,1-Dichloroethylene	05/07/2019	0.85	0.5	--	UG/L	200.00	
524.2 TVOC	05/07/2019	13.24	--	--	UG/L	200.00	
Chloroform	05/07/2019	2.7	0.5	--	UG/L	200.00	
Tetrachloroethylene	05/07/2019	6.8	0.5	--	UG/L	200.00	
Trichloroethylene	05/07/2019	0.79	0.5	--	UG/L	200.00	

Site ID : 800-63

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	1.91	--	--	UG/L	206.00	
Chloroform	05/06/2019	0.96	0.5	--	UG/L	206.00	
Trichloroethylene	05/06/2019	0.95	0.5	--	UG/L	206.00	

Table 14-4
OU III North Street Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 000-471 (NS-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	2.96	--	--	UG/L	0.00	
Carbon tetrachloride	04/03/2019	1.2	0.5	--	UG/L	0.00	
Chloroform	04/03/2019	0.76	0.5	--	UG/L	0.00	
Trichloroethylene	04/03/2019	1	0.5	--	UG/L	0.00	

Site ID : 000-473 (NS-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/03/2019	3.6	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/03/2019	1.5	0.5	--	UG/L	0.00	
524.2 TVOC	04/03/2019	13.78	--	--	UG/L	0.00	
Carbon tetrachloride	04/03/2019	0.58	0.5	--	UG/L	0.00	
Chloroform	04/03/2019	2	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/03/2019	6.1	0.5	--	UG/L	0.00	

Section 15

Q2-2019 Operations Summary
OU III North Street East Pump & Treat System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: June 2004

Table 15-1
OU III North Street East Pump & Treat System
Pumping Rates (gpm)

Extraction Well	NSE-1	NSE-2
Site ID #	000-487	00-488
Screen Interval (ft bls)	161-191	152-182
Desired Flow Rate (GPM)	200	100
April	0	0
May	0	0
June	0	0
Actual (Avg. over Qtr.)	0	0

Notes: The system was shut down June 2014 following approval from the regulators on the Petition for Shutdown.

Figure 15-1
OU III North Street East Pump & Treat System
Cumulative Mass Removal of VOCs vs. Time

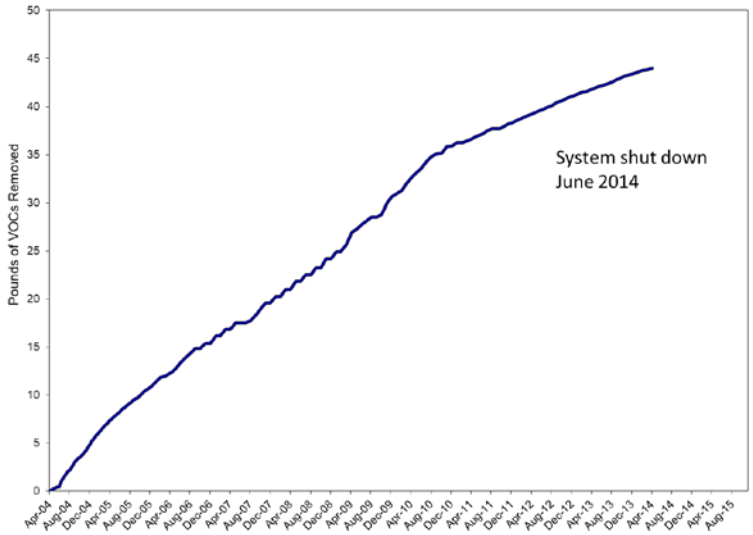


Figure 15-2
OU III North Street East Pump & Treat System
Influent TVOC Concentrations vs. Time

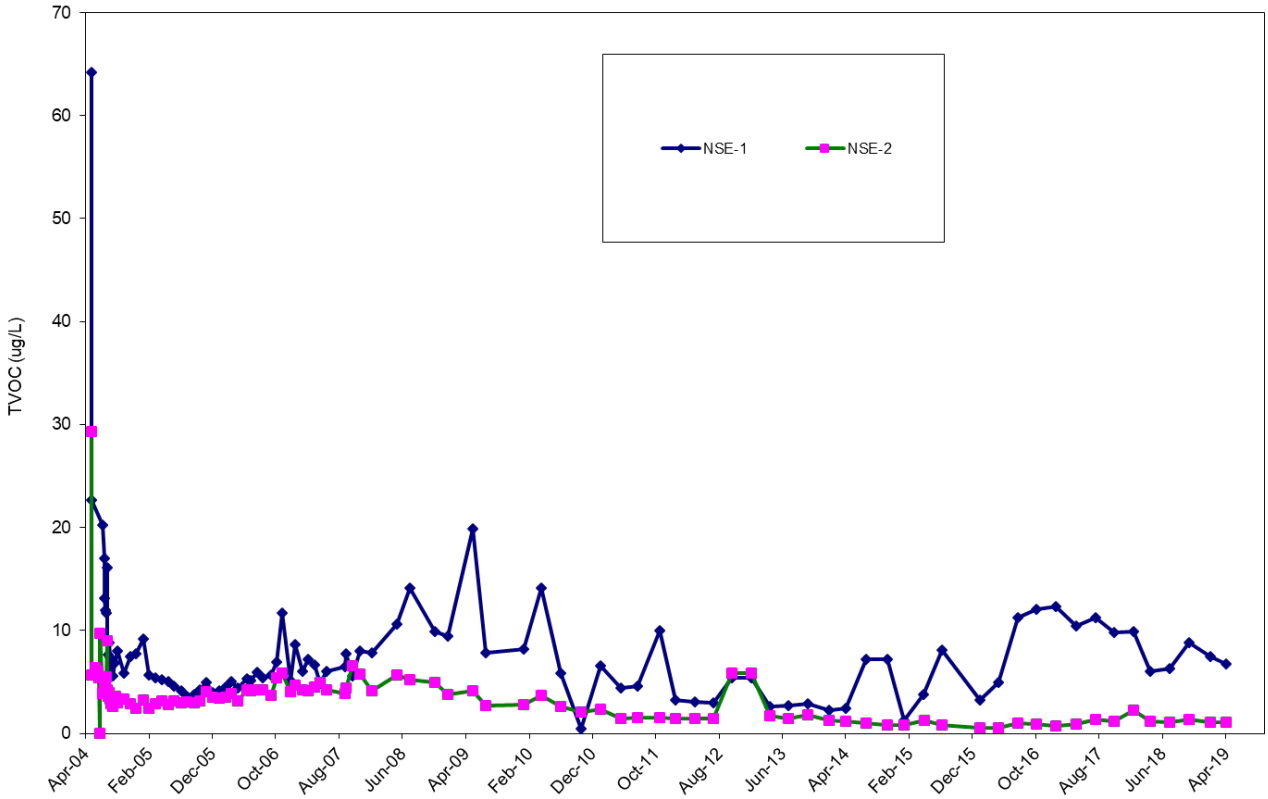


Table 15-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	NA	GPD	Continuous
pH (range)	5.5 - 8.5	NA	SU	Monthly
Carbon Tetrachloride	5	NA	ug/L	Monthly
Chloroform	5	NA	ug/L	Monthly
1,1-Dichloroethane	5	NA	ug/L	Monthly
1,2-Dichloroethane	5	NA	ug/L	Monthly
1,1-Dichloroethylene	5	NA	ug/L	Monthly
Tetrachloroethylene	5	NA	ug/L	Monthly
Toluene	5	NA	ug/L	Monthly
1,1,1-Trichloroethane	5	NA	ug/L	Monthly
Trichloroethylene	10	NA	ug/L	Monthly

NA= Not Applicable. The system is in stand-by mode.

System Operations

April 2019:

The system remained in standby mode.

May 2019:

The system remained in standby mode.

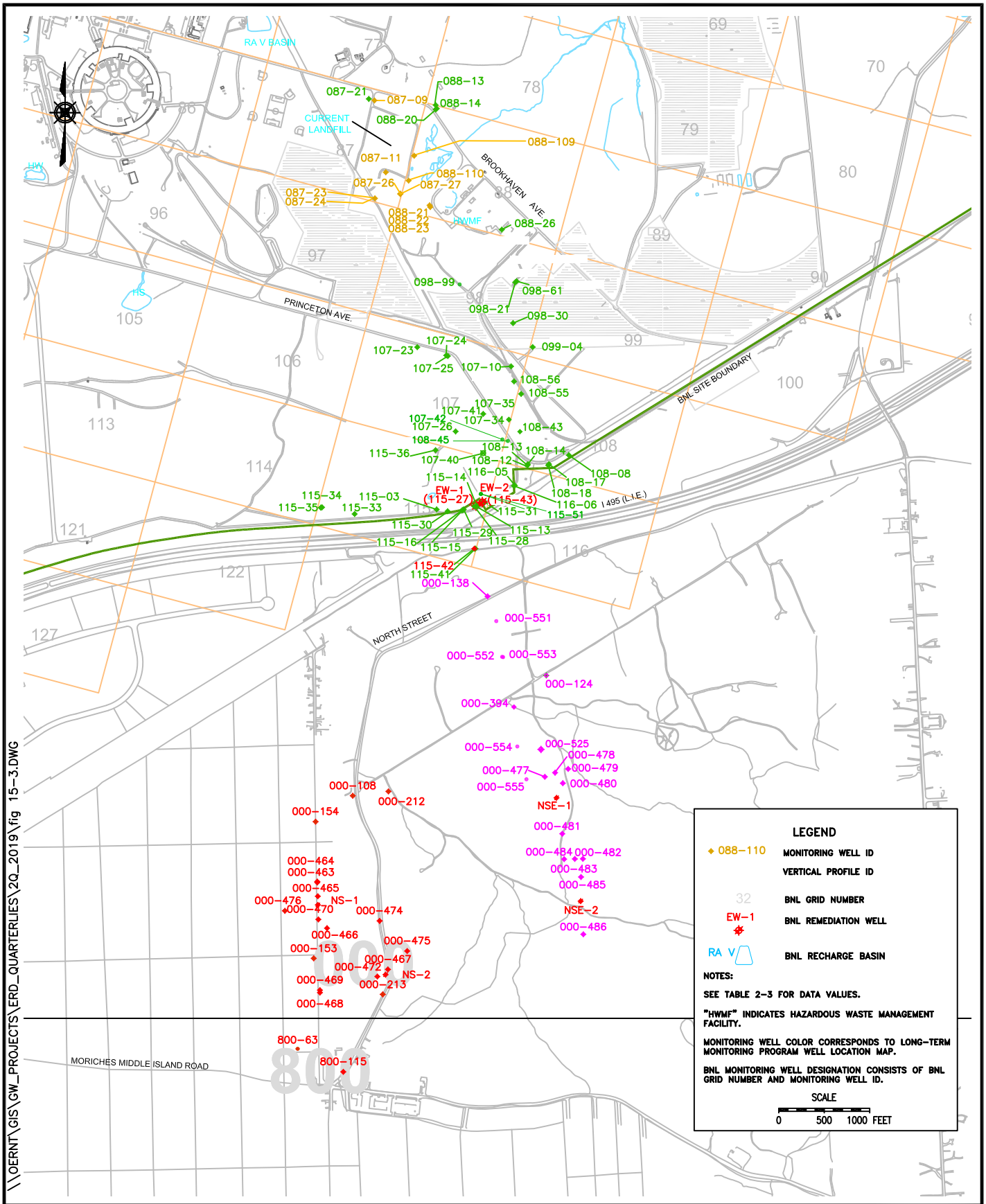
June 2019:

The system remained in standby mode.

Began the design for modification of the treatment system for two additional extraction wells to remediate the ethylene dibromide (EDB) plume. Briefed the private property owner on the planned additional wells and remediation system.

Planned Operational Changes

- Maintain the treatment system in standby mode. The extraction wells will continue to be sampled on a quarterly basis. One or both extraction wells can be restarted if TVOC concentrations in the core monitoring wells or extraction wells rebound above the capture goal of 50 µg/L, or if EDB is detected in NSE-1. During the second quarter, TVOC concentrations in the monitoring and extraction wells were less than 10 µg/L. The maximum EDB concentration detected in the second quarter was in monitoring well 000-394 at 0.271 µg/L. EDB was not detected in NSE-1 in the second quarter. Continue quarterly sampling of NSE-1 for EDB and analyze using Method 504.
- Complete the design for modification of the treatment system for two additional extraction wells. Submit a design modification report to the regulators in September.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU I SOUTH BOUNDARY/NORTH STREET/NORTH STREET EAST MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	08/08/11	NA
CHKD:	APPD:	REV.:	NOTES:
RH	--	10/1/19	–

FIGURE NO.: 15-3

Table 15-3
OU III North Street East Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-138

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	06/12/2019	0.217	0.2	--	UG/L	168.00	

Site ID : 000-394

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	05/09/2019	0.271	0.0199	--	UG/L	178.00	
1,4-Dioxane	06/12/2019	0.411	0.2	--	UG/L	178.00	

Site ID : 000-481

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/09/2019	0.27	--	--	UG/L	174.00	
Chloroform	05/09/2019	0.27	0.5	--	UG/L	174.00	J

Site ID : 000-551

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	05/09/2019	0.0248	0.0197	--	UG/L	175.00	
1,4-Dioxane	06/11/2019	0.231	0.2	--	UG/L	175.00	

Site ID : 000-552

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	05/09/2019	0.191	0.0194	--	UG/L	155.00	
1,4-Dioxane	06/11/2019	0.363	0.2	--	UG/L	155.00	

Site ID : 000-553

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	05/09/2019	0.0741	0.0192	--	UG/L	175.00	
1,4-Dioxane	06/11/2019	0.265	0.2	--	UG/L	175.00	

Site ID : 000-554

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
EDB	05/09/2019	0.269	0.0197	--	UG/L	195.00	
1,4-Dioxane	06/11/2019	0.38	0.2	--	UG/L	195.00	

Site ID : 000-555

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	06/12/2019	4.64	0.2	--	UG/L	200.00	

Site ID : 115-42

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,4-Dioxane	06/11/2019	3.72	0.2	--	UG/L	168.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Table 15-4
OU III North Street East Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 000-487 (NSE-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/03/2019	1.67	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	04/03/2019	1.67	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/03/2019	1.13	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/03/2019	1.13	0.5	--	UG/L	0.00	
524.2 TVOC	04/03/2019	6.78	--	--	UG/L	0.00	
524.2 TVOC	04/03/2019	6.78	--	--	UG/L	0.00	
Carbon tetrachloride	04/03/2019	0.18	0.5	--	UG/L	0.00	J
Carbon tetrachloride	04/03/2019	0.18	0.5	--	UG/L	0.00	J
Chloroform	04/03/2019	2.04	0.5	--	UG/L	0.00	
Chloroform	04/03/2019	2.04	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/03/2019	0.49	0.5	--	UG/L	0.00	J
Tetrachloroethylene	04/03/2019	0.49	0.5	--	UG/L	0.00	J
Trichloroethylene	04/03/2019	1.27	0.5	--	UG/L	0.00	
Trichloroethylene	04/03/2019	1.27	0.5	--	UG/L	0.00	

Site ID : 000-488 (NSE-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/03/2019	1.04	--	--	UG/L	0.00	
524.2 TVOC	04/03/2019	1.04	--	--	UG/L	0.00	
Chloroform	04/03/2019	1.04	0.5	--	UG/L	0.00	
Chloroform	04/03/2019	1.04	0.5	--	UG/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Section 16

Q2-2019 Operations Summary
OU III LIPA/Airport Treatment System

Process: Groundwater extraction and liquid phase granular activated carbon treatment, with discharge to injection wells

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030), and within 65 years for the Magothy aquifer (by 2065).

Start Date: August 2004

Table 16-1
OU III LIPA/Airport Treatment System
Pumping Rates (gpm)

Extraction Well	EW-1L	EW-2L	EW-3L	EW-4L*	RTW-1A	RTW-2A	RTW-3A	RTW-4A*	RTW-5A	RTW-6A
Site ID	000-453	000-455	000-457	000-461	800-109	800-110	800-111	800-112	800-113	800-132
Screen Interval (ft bls)	217-237	224-244	216-236	304-324	188-208	188-208	210-230	268-288	220-240	165-185
Desired Flow Rate (GPM)	0**	0**	0**	0**	100	100	100	100	0***	150
April	0	0	0	0	101	15	5	157	0	160
May	0	0	0	0	101	10	17	99	0	150
June	0	0	0	0	106	0	0	41	0	145
Actual (Avg. over QTR.)	**0**	**0**	**0**	**0**	**103**	**8**	**7**	**99**	**0**	**152**

***** EW-4L and RTW-4A are Magothy aquifer extraction wells.

****** EW-1L, EW-2L, and EW-3L are in standby mode. EW-4L was put in standby January 2017. RTW-2A and RTW-3A are pulse pumping, consisting of one week on and three weeks off. RTW-4A resumed full time operation in 2011.

***RTW-5A was placed on standby September 2016.

Figure 16-1
OU III LIPA/ Airport Treatment System
Cumulative Mass Removal of VOCs vs. Time

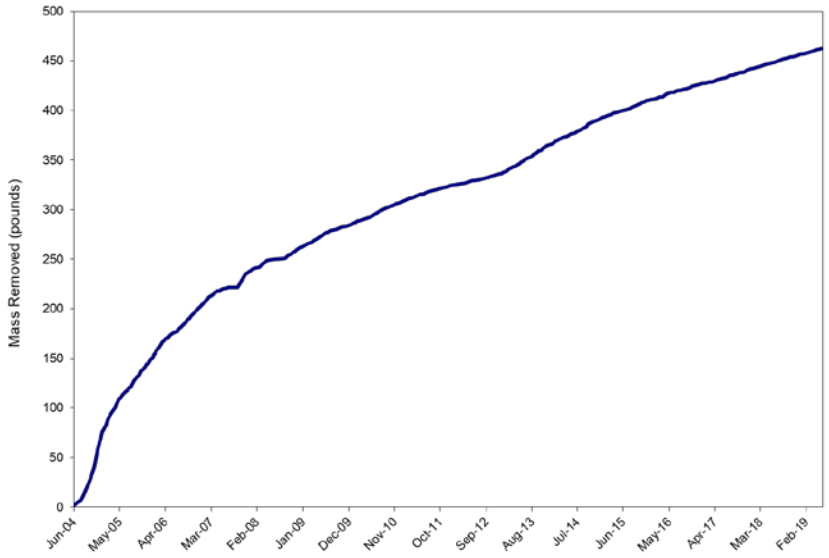


Figure 16-2
OU III LIPA/ Airport Treatment System
Influent TVOC Concentrations vs. Time

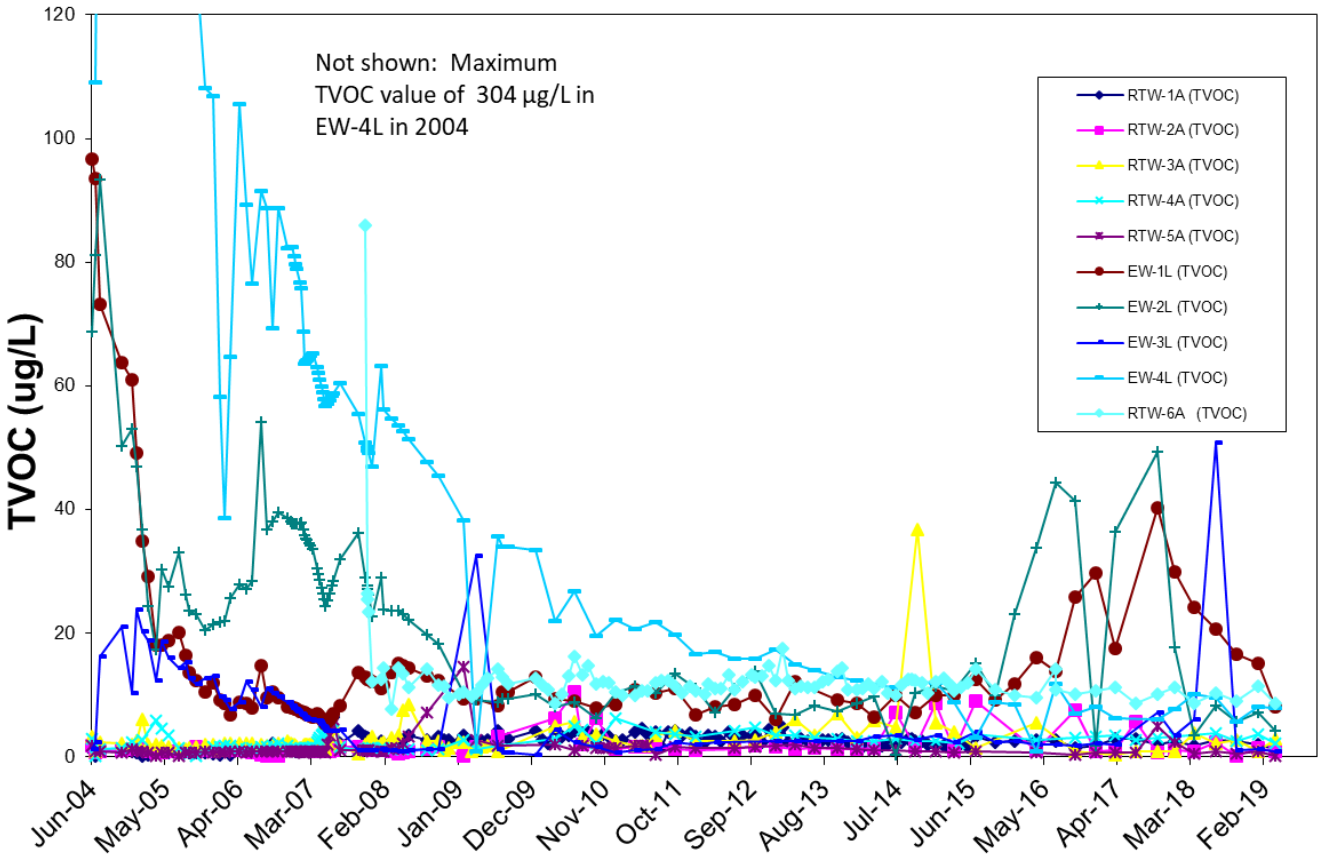


Table 16-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	Monitor	614,282 [1]	GPD	Continuous
pH (range)	5.5 – 7.5	5.6-5.9	SU	Monthly
Carbon Tetrachloride	5	<0.50	ug/L	Monthly
Chloroform	7	<0.50	ug/L	Monthly
1,1-Dichloroethane	5	<0.50	ug/L	Monthly
1,1-Dichloroethylene	5	<0.50	ug/L	Monthly
Methylene Chloride	5	<0.50	ug/L	Monthly
1,1,1-Trichloroethane	5	<0.50	ug/L	Monthly
Trichloroethylene	10	<0.50	ug/L	Monthly

[1] The average flow for the operational period at the influent flow meter.

System Operations

April 2019:

Extraction wells RTW-1A, RWT-4A, and RTW-6A ran normally for the month. RTW-2A, and RTW-3A were pulsed pumped for approximately one week. The LIPA extraction wells and Airport extraction well RTW-5A remained in standby mode. The system treated approximately 19 million gallons of water.

May 2019:

Extraction wells RTW-1A and RTW-6A ran normally for the month. RTW-2A, and RTW-3A were pulsed pumped for approximately one week. RTW-4A was turned off for 10 days as a precaution due to nearby trenching for construction of solar panels. The LIPA system and Airport extraction well RTW-5A remained in standby mode. The system treated approximately 16 million gallons of water.

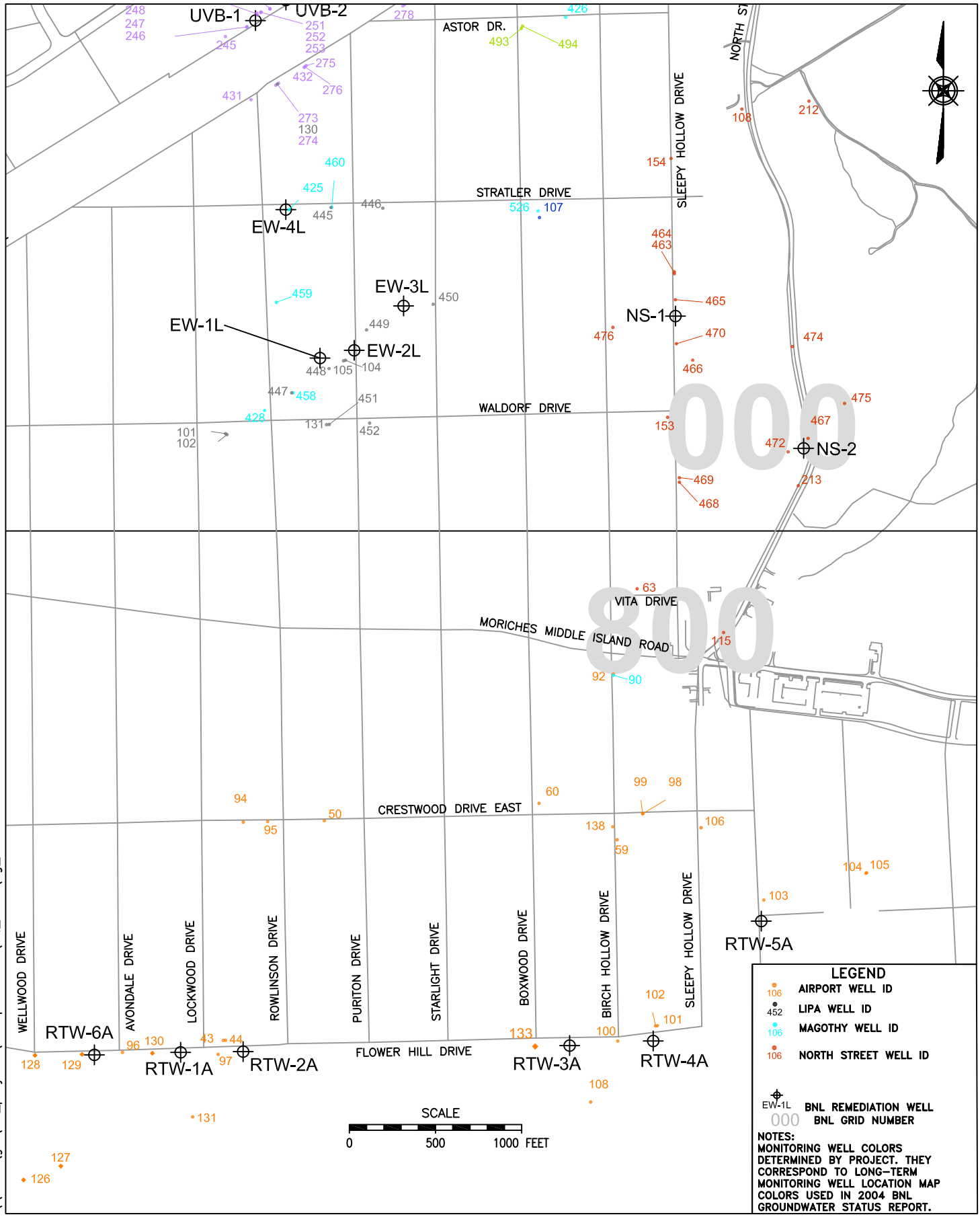
June 2019:

Extraction wells RTW-1A and RTW-6A ran normally for the month. Wells RTW-2A and RTW-3A were not pulsed pumped for approximately one week due to nearby solar array construction. Well RTW-4A was off for three weeks also due to the nearby trenching activities. The LIPA system and Airport extraction well RTW-5A remained in standby mode. The system treated approximately 12.5 million gallons of water.

The system treated approximately 47.5 million gallons of water during the second quarter of 2019.

Planned Operational Changes

- Continue the Airport extraction wells pulsed pumping schedule of pumping one week per month for wells RTW-2A and RTW-3A and continue full time operation of wells RTW-1A, RTW-4A and RTW-6A. Maintain well RTW-5A in standby mode. If concentrations above the capture goal of 10 µg/L TVOC are observed in any of the extraction wells or the monitoring wells adjacent to wells that are not operating, the well(s) will be put back into full-time operation. During the second quarter of 2019, extraction wells RTW-2A, RTW-3A, RTW-5A, and adjacent monitoring wells did not exceed TVOC concentrations of 10 µg/L.
- Maintain LIPA wells EW-1, EW-2, EW-3L and EW-4L in standby mode. These extraction wells may be restarted if TVOC concentrations rebound above the 50 µg/L capture goal in either the plume core monitoring wells or the extraction wells. During the second quarter of 2019, none of the LIPA monitoring wells detected TVOCs above the capture goal of 50 µg/L.



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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III AIRPORT/LIPA

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	09/26/05	–
CHKD:	APPD:	REV.:	NOTES:
BH	––	10/1/19	–

FIGURE NO.: 16-3

Table 16-3
OU III LIPA/Airport Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-104

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/23/2019	2.9	0.5	--	UG/L	205.00	
1,1-Dichloroethylene	05/23/2019	2.7	0.5	--	UG/L	205.00	
524.2 TVOC	05/23/2019	8.1	--	--	UG/L	205.00	
Chloroform	05/23/2019	1.5	0.5	--	UG/L	205.00	
Trichloroethylene	05/23/2019	1	0.5	--	UG/L	205.00	

Site ID : 000-130

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/21/2019	1.77	--	--	UG/L	280.00	
Chloroform	05/21/2019	1.1	0.5	--	UG/L	280.00	
Tetrachloroethylene	05/21/2019	0.67	0.5	--	UG/L	280.00	

Site ID : 000-131

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/23/2019	5.8	0.5	--	UG/L	225.00	
1,1-Dichloroethylene	05/23/2019	5.4	0.5	--	UG/L	225.00	
1,2-Dichloroethane	05/23/2019	0.57	0.5	--	UG/L	225.00	
524.2 TVOC	05/23/2019	13.27	--	--	UG/L	225.00	
Trichloroethylene	05/23/2019	1.5	0.5	--	UG/L	225.00	

Site ID : 000-425

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/20/2019	2.22	--	--	UG/L	315.00	
Tetrachloroethylene	05/20/2019	1.5	0.5	--	UG/L	315.00	
Trichloroethylene	05/20/2019	0.72	0.5	--	UG/L	315.00	

Site ID : 000-428

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/20/2019	0	--	--	UG/L	298.00	

Site ID : 000-447

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/24/2019	1.8	--	--	UG/L	219.00	
Chloroform	05/24/2019	1.8	0.5	--	UG/L	219.00	

Site ID : 000-448

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/24/2019	3.2	0.5	--	UG/L	212.00	
1,1-Dichloroethylene	05/24/2019	2.7	0.5	--	UG/L	212.00	
524.2 TVOC	05/24/2019	7.86	--	--	UG/L	212.00	
Chloroform	05/24/2019	0.76	0.5	--	UG/L	212.00	
Trichloroethylene	05/24/2019	1.2	0.5	--	UG/L	212.00	

Table 16-3
OU III LIPA/Airport Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 000-449

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/23/2019	0.63	0.5	--	UG/L	193.00	
524.2 TVOC	05/23/2019	1.29	--	--	UG/L	193.00	
Trichloroethylene	05/23/2019	0.66	0.5	--	UG/L	193.00	

Site ID : 000-451

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/23/2019	3.3	0.5	--	UG/L	193.00	
1,1-Dichloroethylene	05/23/2019	2.3	0.5	--	UG/L	193.00	
524.2 TVOC	05/23/2019	7.92	--	--	UG/L	193.00	
Chloroform	05/23/2019	1.4	0.5	--	UG/L	193.00	
Trichloroethylene	05/23/2019	0.92	0.5	--	UG/L	193.00	

Site ID : 000-452

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/24/2019	3.2	0.5	--	UG/L	217.00	
1,1-Dichloroethylene	05/24/2019	2.5	0.5	--	UG/L	217.00	
524.2 TVOC	05/24/2019	6.53	--	--	UG/L	217.00	
Trichloroethylene	05/24/2019	0.83	0.5	--	UG/L	217.00	

Site ID : 800-100

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/03/2019	0	--	--	UG/L	214.00	

Site ID : 800-101

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	06/04/2019	1.1	0.5	--	UG/L	280.00	
1,1,2,2-Tetrachloroethane	06/04/2019	7.5	0.5	--	UG/L	280.00	
1,1-Dichloroethylene	06/04/2019	0.93	0.5	--	UG/L	280.00	
1,2-Dichloroethane	06/04/2019	0.84	0.5	--	UG/L	280.00	
524.2 TVOC	06/04/2019	33.97	--	--	UG/L	280.00	
Carbon tetrachloride	06/04/2019	3.6	0.5	--	UG/L	280.00	
Chloroform	06/04/2019	4	0.5	--	UG/L	280.00	
Trichloroethylene	06/04/2019	16	0.5	--	UG/L	280.00	

Site ID : 800-102

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/03/2019	0.74	--	--	UG/L	304.00	
Chloroform	06/03/2019	0.74	0.5	--	UG/L	304.00	

Site ID : 800-103

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/03/2019	0	--	--	UG/L	225.00	

Site ID : 800-104

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/04/2019	0	--	--	UG/L	170.00	

Table 16-3
OU III LIPA/Airport Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 800-105

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/04/2019	0.99	--	--	UG/L	233.00	
Chloroform	06/04/2019	0.99	0.5	--	UG/L	233.00	

Site ID : 800-106

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/04/2019	0	--	--	UG/L	217.00	

Site ID : 800-108

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/03/2019	0	--	--	UG/L	216.00	

Site ID : 800-126

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/03/2019	0	--	--	UG/L	175.00	

Site ID : 800-127

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/30/2019	0	--	--	UG/L	175.00	

Site ID : 800-128

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/28/2019	0	--	--	UG/L	180.00	

Site ID : 800-129

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/28/2019	0	--	--	UG/L	180.00	

Site ID : 800-130

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1-Dichloroethylene	05/28/2019	0.61	0.5	--	UG/L	185.00	
524.2 TVOC	05/28/2019	21.83	--	--	UG/L	185.00	
Carbon tetrachloride	05/28/2019	8.5	0.5	--	UG/L	185.00	
Chloroform	05/28/2019	0.72	0.5	--	UG/L	185.00	
Trichloroethylene	05/28/2019	12	0.5	--	UG/L	185.00	

Site ID : 800-131

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/30/2019	0	--	--	UG/L	194.00	

Site ID : 800-133

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	06/03/2019	1.2	--	--	UG/L	225.00	
Chloroform	06/03/2019	1.2	0.5	--	UG/L	225.00	

Table 16-3
OU III LIPA/Airport Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 800-138

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/29/2019	1.24	--	--	UG/L	250.00	
Chloroform	05/29/2019	0.67	0.5	--	UG/L	250.00	
Trichloroethylene	05/29/2019	0.57	0.5	--	UG/L	250.00	

Site ID : 800-43

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/24/2019	0.98	--	--	UG/L	157.00	
Chloroform	05/24/2019	0.98	0.5	--	UG/L	157.00	

Site ID : 800-44

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/24/2019	3.2	--	--	UG/L	212.00	
Carbon tetrachloride	05/24/2019	3.2	0.5	--	UG/L	212.00	

Site ID : 800-50

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/28/2019	0	--	--	UG/L	205.00	

Site ID : 800-59

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/29/2019	0	--	--	UG/L	208.00	

Site ID : 800-60

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/29/2019	0.57	--	--	UG/L	210.00	
Chloroform	05/29/2019	0.57	0.5	--	UG/L	210.00	

Site ID : 800-63

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/06/2019	1.91	--	--	UG/L	206.00	
Chloroform	05/06/2019	0.96	0.5	--	UG/L	206.00	
Trichloroethylene	05/06/2019	0.95	0.5	--	UG/L	206.00	

Site ID : 800-90

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/21/2019	6.6	--	--	UG/L	255.00	
Carbon tetrachloride	05/21/2019	1.6	0.5	--	UG/L	255.00	
Chloroform	05/21/2019	1.4	0.5	--	UG/L	255.00	
Trichloroethylene	05/21/2019	3.6	0.5	--	UG/L	255.00	

Site ID : 800-92

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/30/2019	4.16	--	--	UG/L	200.00	
Carbon tetrachloride	05/30/2019	0.76	0.5	--	UG/L	200.00	
Chloroform	05/30/2019	1.3	0.5	--	UG/L	200.00	
Trichloroethylene	05/30/2019	2.1	0.5	--	UG/L	200.00	

Table 16-3
OU III LIPA/Airport Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 800-94

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/28/2019	1.6	0.5	--	UG/L	185.00	
1,1-Dichloroethylene	05/28/2019	1.8	0.5	--	UG/L	185.00	
524.2 TVOC	05/28/2019	57.6	--	--	UG/L	185.00	
Carbon tetrachloride	05/28/2019	28	0.5	--	UG/L	185.00	
Chloroform	05/28/2019	1.2	0.5	--	UG/L	185.00	
Trichloroethylene	05/28/2019	25	0.5	--	UG/L	185.00	

Site ID : 800-95

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/28/2019	25	--	--	UG/L	187.00	
Carbon tetrachloride	05/28/2019	13	0.5	--	UG/L	187.00	
Chloroform	05/28/2019	1	0.5	--	UG/L	187.00	
Trichloroethylene	05/28/2019	11	0.5	--	UG/L	187.00	

Site ID : 800-96

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	05/28/2019	2.3	0.5	--	UG/L	189.00	
1,1-Dichloroethylene	05/28/2019	3.8	0.5	--	UG/L	189.00	
1,2-Dichloroethane	05/28/2019	0.56	0.5	--	UG/L	189.00	
524.2 TVOC	05/28/2019	45.51	--	--	UG/L	189.00	
Carbon tetrachloride	05/28/2019	26	0.5	--	UG/L	189.00	
Chloroform	05/28/2019	1.2	0.5	--	UG/L	189.00	
cis-1,2-Dichloroethylene	05/28/2019	0.65	0.5	--	UG/L	189.00	
Trichloroethylene	05/28/2019	11	0.5	--	UG/L	189.00	

Site ID : 800-97

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/30/2019	2.1	--	--	UG/L	199.00	
Carbon tetrachloride	05/30/2019	2.1	0.5	--	UG/L	199.00	

Site ID : 800-98

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/30/2019	0	--	--	UG/L	184.00	

Site ID : 800-99

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	05/30/2019	0.68	--	--	UG/L	248.00	
Trichloroethylene	05/30/2019	0.68	0.5	--	UG/L	248.00	

Table 16-4
OU III LIPA/Airport Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 000-453 (EW-1L)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/09/2019	2.6	0.5	--	UG/L	227.00	
1,1-Dichloroethylene	04/09/2019	1.9	0.5	--	UG/L	227.00	
524.2 TVOC	04/09/2019	8.1	--	--	UG/L	227.00	
Chloroform	04/09/2019	2.1	0.5	--	UG/L	227.00	
Trichloroethylene	04/09/2019	1.5	0.5	--	UG/L	227.00	

Site ID : 000-455 (EW-2L)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/09/2019	1	0.5	--	UG/L	234.00	
1,1-Dichloroethylene	04/09/2019	0.8	0.5	--	UG/L	234.00	
524.2 TVOC	04/09/2019	4.08	--	--	UG/L	234.00	
Chloroform	04/09/2019	0.98	0.5	--	UG/L	234.00	
Trichloroethylene	04/09/2019	1.3	0.5	--	UG/L	234.00	

Site ID : 000-457 (EW-3L)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	0.77	--	--	UG/L	226.00	
Chloroform	04/09/2019	0.77	0.5	--	UG/L	226.00	

Site ID : 000-461 (EW-4L)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	7.87	--	--	UG/L	314.00	
Carbon tetrachloride	04/09/2019	1.3	0.5	--	UG/L	314.00	
Chloroform	04/09/2019	0.87	0.5	--	UG/L	314.00	
Tetrachloroethylene	04/09/2019	4	0.5	--	UG/L	314.00	
Trichloroethylene	04/09/2019	1.7	0.5	--	UG/L	314.00	

Site ID : 800-109 (RTW-1A)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	1.18	--	--	UG/L	198.00	
Carbon tetrachloride	04/09/2019	0.64	0.5	--	UG/L	198.00	
Chloroform	04/09/2019	0.54	0.5	--	UG/L	198.00	

Site ID : 800-110 (RTW-2A)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	0.75	--	--	UG/L	198.00	
Chloroform	04/09/2019	0.75	0.5	--	UG/L	198.00	

Site ID : 800-111 (RTW-3A)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/09/2019	0.56	0.5	--	UG/L	220.00	
1,1-Dichloroethylene	04/09/2019	0.63	0.5	--	UG/L	220.00	
524.2 TVOC	04/09/2019	2.86	--	--	UG/L	220.00	
Chloroform	04/09/2019	0.7	0.5	--	UG/L	220.00	
Trichloroethylene	04/09/2019	0.97	0.5	--	UG/L	220.00	

Table 16-4
OU III LIPA/Airport Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 800-112 (RTW-4A)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	2.1	--	--	UG/L	278.00	
Chloroform	04/09/2019	1	0.5	--	UG/L	278.00	
Trichloroethylene	04/09/2019	1.1	0.5	--	UG/L	278.00	

Site ID : 800-113 (RTW-5A)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	0	--	--	UG/L	230.00	

Site ID : 800-132 (RTW-6A)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	8.51	--	--	UG/L	175.00	
Carbon tetrachloride	04/09/2019	2.3	0.5	--	UG/L	175.00	
Chloroform	04/09/2019	0.71	0.5	--	UG/L	175.00	
Trichloroethylene	04/09/2019	5.5	0.5	--	UG/L	175.00	

Table 16-5
OU III LIPA/Airport Influent Data
"Hits Only" - April through June 2019

Site ID : 800-122 (Combined Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/09/2019	0.62	0.5	--	UG/L	0.00	
1,1-Dichloroethylene	04/09/2019	0.61	0.5	--	UG/L	0.00	
524.2 TVOC	04/09/2019	5.04	--	--	UG/L	0.00	
Carbon tetrachloride	04/09/2019	0.75	0.5	--	UG/L	0.00	
Chloroform	04/09/2019	0.95	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/09/2019	0.51	0.5	--	UG/L	0.00	
Trichloroethylene	04/09/2019	1.6	0.5	--	UG/L	0.00	
524.2 TVOC	04/23/2019	4.32	--	--	UG/L	0.00	
Carbon tetrachloride	04/23/2019	1.2	0.5	--	UG/L	0.00	
Chloroform	04/23/2019	0.72	0.5	--	UG/L	0.00	
Trichloroethylene	04/23/2019	2.4	0.5	--	UG/L	0.00	
524.2 TVOC	05/01/2019	4.47	--	--	UG/L	0.00	
Carbon tetrachloride	05/01/2019	1.2	0.5	--	UG/L	0.00	
Chloroform	05/01/2019	0.77	0.5	--	UG/L	0.00	
Trichloroethylene	05/01/2019	2.5	0.5	--	UG/L	0.00	
524.2 TVOC	05/14/2019	3.55	--	--	UG/L	0.00	
Carbon tetrachloride	05/14/2019	0.86	0.5	--	UG/L	0.00	
Chloroform	05/14/2019	0.69	0.5	--	UG/L	0.00	
Trichloroethylene	05/14/2019	2	0.5	--	UG/L	0.00	
524.2 TVOC	06/05/2019	4.44	--	--	UG/L	0.00	
Carbon tetrachloride	06/05/2019	1.2	0.5	--	UG/L	0.00	
Chloroform	06/05/2019	0.84	0.5	--	UG/L	0.00	
Trichloroethylene	06/05/2019	2.4	0.5	--	UG/L	0.00	
524.2 TVOC	06/19/2019	4.6	--	--	UG/L	0.00	
Carbon tetrachloride	06/19/2019	1.3	0.5	--	UG/L	0.00	
Chloroform	06/19/2019	0.8	0.5	--	UG/L	0.00	
Trichloroethylene	06/19/2019	2.5	0.5	--	UG/L	0.00	

Table 16-6
OU III LIPA/Airport Effluent Data
"Hits Only" - April through June 2019

Site ID : 800-124 (System Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	0	--	--	UG/L	0.00	
524.2 TVOC	04/23/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/01/2019	0	--	--	UG/L	0.00	
524.2 TVOC	05/14/2019	0	--	--	UG/L	0.00	
524.2 TVOC	06/05/2019	0	--	--	UG/L	0.00	
524.2 TVOC	06/19/2019	0	--	--	UG/L	0.00	

Section 17

Q2-2019 Operations Summary
OU III Strontium-90 BGRR/WCF Treatment System

Process: Groundwater extraction with liquid phase granular activated carbon treatment for volatile organic compounds, followed by clinoptilolite zeolite treatment for the removal of Sr-90, with discharge to dry wells.

Goal: Reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 70 years for the Upper Glacial aquifer (by 2070).

Start Date: June 2005

Table 17-1
OU III Strontium-90 BGRR/WCF Treatment System
Pumping Rates (gpm)

Extraction Well	SR-1	SR-2	SR-3	SR-4*	SR-5*	SR-6*	SR-7	SR-8	SR-9
Site Id #	065-368	065-369	075-676	075-677	075-678	065-403	075-702	075-703	075-704
Screen Interval (ft bls)	33-53	33.5-53.5	51-71	35-75	35-75	85-105	82-102	77-97	67-87
Desired Flow Rate (gpm)	**5**	**5**	**5**	**5**	**5**	**10**	**10**	**10**	**10**
April (Avg gpm)	4.9	4.9	8.5	0	0	0	0	0	10
May "	5.4	5.4	8	0	0	0	0	3.9	10
June "	5.4	4.8	5.8	0	0	0	0	0	10
Actual (Avg. over Qtr.)	**5.2**	**5.0**	**7.4**	**0**	**0**	**0**	**0**	**1.3**	**10**

*Wells SR-4 and SR-5 were placed in stand-by mode in September 2016. Well SR-6 was placed in standby mode in October 2017. Wells SR-3 and SR-7 were placed in standby mode October 2018. Well SR-8 was placed in pulsed pumping mode in October 2018. Well SR-3 was put back in operation in February 2019.

Figure 17-1
Strontium-90 BGRR/WCF Treatment System
Cumulative Millicuries Removed

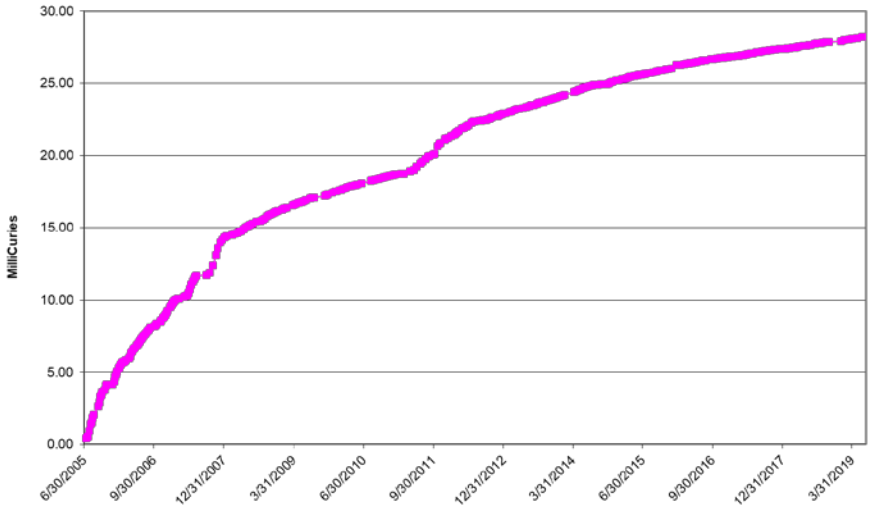

Figure 17-2
Strontium-90 BGRR/WCF Treatment System
Influent Sr-90 Concentrations vs. Time

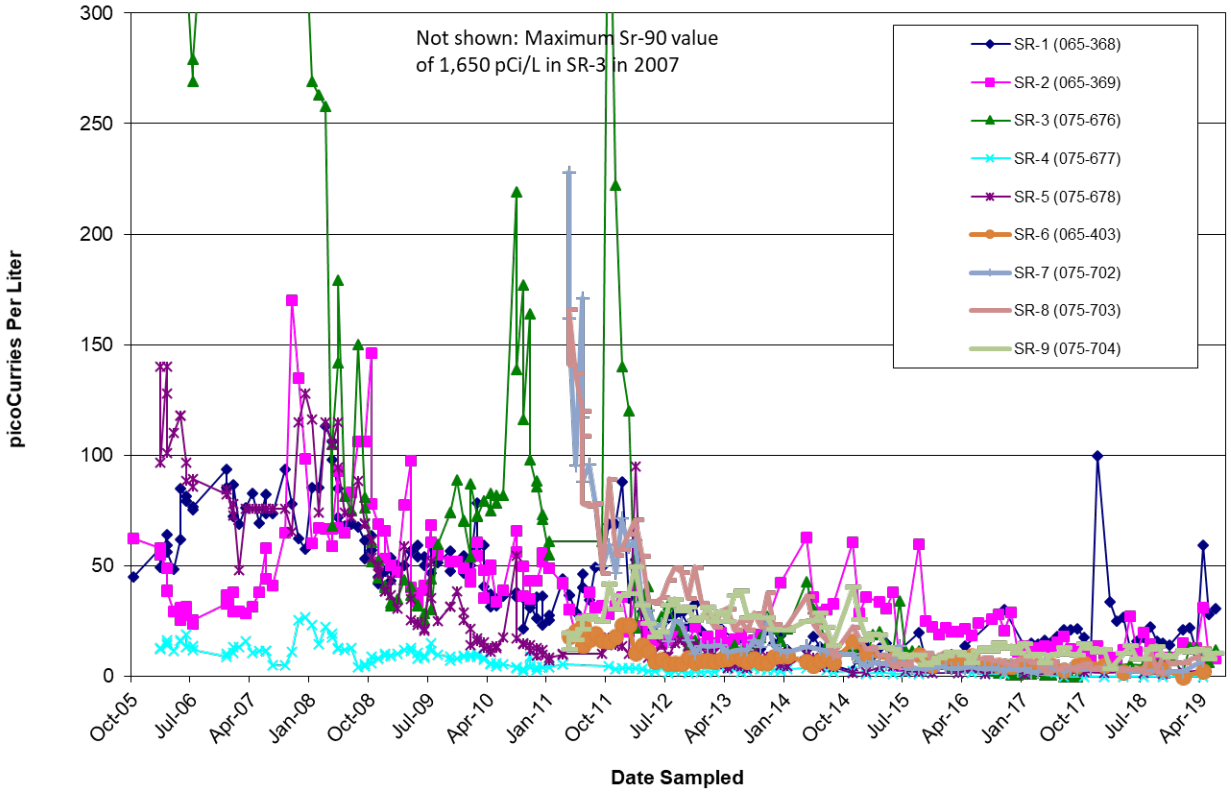

Table 17-2
Strontium-90 BGRR/WCF Treatment System Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1, 2019 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency
Flow	75	33	GPM	Continuous
pH (range)	5.5 – 8.5	6.3– 6.8	SU	Weekly
Strontium-90	8.0	<0.5	PCi/L	Monthly[1]
Chloroform	7.0	<0.5	ug/L	Monthly[1]
1,1-Dichloroethane	5.0	<0.5	ug/L	Monthly[1]
Ethylbenzene	5.0	<0.5	ug/L	Monthly[1]
Methyl Chloride	5.0	<0.5	ug/L	Monthly[1]
Methylene Chloride	5.0	<0.5	ug/L	Monthly[1]
Toluene	5.0	<0.5	ug/L	Monthly[1]
1,2,3-Trichlorobenzene	5.0	<0.5	ug/L	Monthly[1]
1,1,1-Trichloroethane	5.0	<0.5	ug/L	Monthly[1]
1,2,4-Trimethylbenzene	5.0	<0.5	ug/L	Monthly[1]
Xylene, total	10.0	<0.5	ug/L	Monthly[1]

[1] The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations.
[2] Not detected.

System Operations

April 2019:

The system ran normally for the month. Wells SR-4 through SR-7 were off in stand-by mode. Well SR-8 was off for pulsed pumping. The system treated approximately 1.2 million gallons of water.

May 2019:

The system operated normally for the month. Wells SR-4 through SR-7 were in stand-by mode. Well SR-8 was off for one week for electrical repairs. The system treated approximately 1.3 million gallons of water.

June 2019:

The system ran normally for the month. Wells SR-4 through SR-7 were off in stand-by mode. Well SR-8 was off for pulsed pumping. The system treated approximately 1.1 million gallons of water.

The system treated approximately 3.6 million gallons of water during the second quarter of 2019.

Planned Operational Changes

- Continue operating wells SR-1, SR-2, SR-3 and SR-9 in full time mode, and maintain wells SR-4, SR-5, SR-6 and SR-7 in standby mode. If significant rebound occurs, place these extraction wells back in full time operation. Sr-90 concentrations in SR-4, SR-5, and SR-6 have remained below the drinking water standard since May 2016.
- Maintain SR-8 in pulsed pumping mode (one month on and one month off) based on low but slightly increasing Sr-90 concentrations since August 2018.
- Continue to supplement the current monitoring network with temporary well data to get a comprehensive status of the plumes and account for well network gaps and groundwater flow related plume shifts. Areas of focus include:
    - Install up to 15 temporary wells to fill in monitoring network data gaps north of the HFBR and just south of the WCF.
    - Install a temporary well downgradient of BGRR sentinel well 085-403 to re-establish the location of the leading edge of the plume.

LEGEND

160 MONITORING WELL ID

SR-1 EXTRACTION WELL ID

75 BNL GRID NUMBER

HFBR – HIGH FLUX BEAM REACTOR

WCF – WASTE CONCENTRATION FACILITY

BGRR – BROOKHAVEN GRAPHITE RESEARCH REACTOR

FORMER D-WASTE TANK AREA

WASTE CONCENTRATION FACILITY

FORMER UNDERGROUND TANKS A & B

TANK 2 TANK 1 TANK 4 TANK 3 810

SR-1 SR-2 SR-3 SR-4 SR-5 SR-6 SR-7 SR-8 SR-9

BGRR

FORMER PILE FAN SUMP LOCATION

Building 801 Building 701 FORMER CANAL HOUSE

BLDG. 708 UNDG. DUCTS LOCATION

HFBR

65 75

LAWRENCE DR. RUTHERFORD DR. CORNELL AVENUE BROOKHAVEN AVENUE BELL AVENUE TECHNOLOGY STREET TEMPLE PLACE GROVE STREET RAILROAD STREET RAILROAD

TO BLDG 855

SCALE 0 150 300 FEET

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BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE:

OU III BGRR/WCF

SITEWIDE REMEDIATION SYSTEMS SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
JEB	–	03/15/13	
CHKD:	APPD:	REV.:	NOTES:
JEB	BH	10/1/19	
FIGURE NO.:		17–3	

Table 17-3
OU III Strontium-90 BGRR/WCF Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 065-160

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/16/2019	2.12	0.253	0.329	PCI/L	40.10	

Site ID : 065-175

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	13.8	0.267	1.3	PCI/L	40.00	

Site ID : 065-37

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/04/2019	14	0.756	1.28	PCI/L	71.10	

Site ID : 065-39

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/12/2019	31.4	0.231	2.73	PCI/L	87.40	

Site ID : 065-404

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/12/2019	1.33	0.317	0.302	PCI/L	100.00	

Site ID : 075-48

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/11/2019	0.742	0.208	0.189	PCI/L	63.00	

Site ID : 075-664

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	58.9	0.253	4.99	PCI/L	70.00	

Site ID : 075-670

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/11/2019	0.694	0.272	0.216	PCI/L	94.00	

Site ID : 075-671

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/11/2019	1.83	0.272	0.303	PCI/L	109.00	

Site ID : 075-682

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/12/2019	3.33	0.222	0.419	PCI/L	81.00	

Site ID : 075-684

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/11/2019	12.7	0.217	1.19	PCI/L	79.00	

Table 17-3
OU III Strontium-90 BGRR/WCF Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 075-699

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	6.1	0.215	0.645	PCI/L	79.53	

Site ID : 075-700

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	1.9	0.244	0.309	PCI/L	63.25	

Site ID : 075-701

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/04/2019	88.2	0.772	3.12	PCI/L	57.80	
Strontium-90	05/09/2019	89.4	0.775	2.7	PCI/L	58.02	
Strontium-90	06/12/2019	182	0.76	3.33	PCI/L	56.70	

Site ID : 075-705

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/12/2019	1.8	0.231	0.295	PCI/L	90.00	

Site ID : 075-706

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	1.01	0.236	0.231	PCI/L	95.00	

Site ID : 075-707

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/15/2019	3.67	0.26	0.456	PCI/L	75.00	

Site ID : 085-398

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/10/2019	12.1	0.313	1.17	PCI/L	130.00	

Site ID : 085-399

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/11/2019	0.304	0.246	0.166	PCI/L	65.00	N2

Site ID : 085-402

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/10/2019	5.71	0.246	0.624	PCI/L	95.00	

Site ID : 085-403

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/10/2019	33.1	0.228	2.87	PCI/L	120.00	

Table 17-4
OU III Strontium-90 BGRR/WCF Extraction Well Data
"Hits Only" - April through June 2019

Site ID : 065-368 (SR-1)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	59.5	0.742	2.56	PCI/L	0.00	
Strontium-90	05/02/2019	28.1	0.491	0.856	PCI/L	0.00	
Strontium-90	06/06/2019	30.7	0.64	1.45	PCI/L	0.00	

Site ID : 065-369 (SR-2)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	31.2	0.487	1.8	PCI/L	0.00	
Strontium-90	05/02/2019	8.49	0.407	0.468	PCI/L	0.00	
Strontium-90	06/06/2019	8.21	0.755	0.819	PCI/L	0.00	

Site ID : 065-403 (SR-6)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	2.33	0.776	0.57	PCI/L	0.00	
Tritium	04/02/2019	1170	341	267	PCI/L	0.00	

Site ID : 075-676 (SR-3)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	9.53	0.775	0.805	PCI/L	0.00	
Strontium-90	05/02/2019	6.36	0.763	0.578	PCI/L	0.00	
Strontium-90	06/06/2019	11.8	0.785	0.868	PCI/L	0.00	

Site ID : 075-678 (SR-5)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	2.77	0.769	0.614	PCI/L	0.00	

Site ID : 075-702 (SR-7)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	7.05	0.625	0.945	PCI/L	0.00	

Site ID : 075-703 (SR-8)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	12.7	0.771	1.07	PCI/L	0.00	
Tritium	04/02/2019	1320	332	269	PCI/L	0.00	
Strontium-90	05/02/2019	10.3	0.547	0.571	PCI/L	0.00	
Tritium	05/02/2019	1140	457	322	PCI/L	0.00	

Site ID : 075-704 (SR-9)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Strontium-90	04/02/2019	12.1	0.763	1.06	PCI/L	0.00	
Strontium-90	05/02/2019	7.94	0.511	0.494	PCI/L	0.00	
Strontium-90	06/06/2019	10.8	0.762	1.2	PCI/L	0.00	

Table 17-5
OU III Strontium-90 BGRR/WCF Influent Data
"Hits Only" - April through June 2019

Site ID : 066-216 (Combined Influent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/02/2019	0.3	0.5	--	UG/L	0.00	J
524.2 TVOC	04/02/2019	0.77	--	--	UG/L	0.00	
Ethene, 1,2-dichloro-, (E)-	04/02/2019	0.47	0.5	--	UG/L	0.00	J
Strontium-90	04/02/2019	13.3	0.768	1.1	PCI/L	0.00	
Tritium	04/02/2019	455	340	222	PCI/L	0.00	J
1,1,1-Trichloroethane	05/02/2019	0.28	0.5	--	UG/L	0.00	J
1,1-Dichloroethane	05/02/2019	0.17	0.5	--	UG/L	0.00	J
524.2 TVOC	05/02/2019	1.26	--	--	UG/L	0.00	
Ethene, 1,2-dichloro-, (E)-	05/02/2019	0.45	0.5	--	UG/L	0.00	J
Strontium-90	05/02/2019	13.5	0.785	0.733	PCI/L	0.00	
Trichloroethylene	05/02/2019	0.36	0.5	--	UG/L	0.00	J
1,1,1-Trichloroethane	06/06/2019	0.28	0.5	--	UG/L	0.00	J
524.2 TVOC	06/06/2019	0.28	--	--	UG/L	0.00	
Strontium-90	06/06/2019	17.2	0.788	1.54	PCI/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Table 17-6
OU III Strontium-90 BGRR/WCF Effluent Data
"Hits Only" - April through June 2019

Site ID : 066-219 (System Effluent)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
1,1,1-Trichloroethane	04/02/2019	0.39	0.5	--	UG/L	0.00	J
524.2 TVOC	04/02/2019	1.41	--	--	UG/L	0.00	
Ethene, 1,2-dichloro-, (E)-	04/02/2019	1.02	0.5	--	UG/L	0.00	
1,1,1-Trichloroethane	05/02/2019	0.28	0.5	--	UG/L	0.00	J
524.2 TVOC	05/02/2019	1.38	--	--	UG/L	0.00	
Ethene, 1,2-dichloro-, (E)-	05/02/2019	0.64	0.5	--	UG/L	0.00	
Trichloroethylene	05/02/2019	0.46	0.5	--	UG/L	0.00	J
1,1-Dichloroethane	06/06/2019	0.17	0.5	--	UG/L	0.00	J
524.2 TVOC	06/06/2019	0.17	--	--	UG/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.

Section 18

Q-2 2019 Quarterly Monitoring Summary
g-2 Source Area and Tritium Plume

1.0 Background

In November 1999, tritium was detected in the groundwater near the g-2 experiment at concentrations above the 20,000 pCi/L maximum contaminant level (MCL). Sodium-22 was also detected in the groundwater, but at concentrations well below the 400 pCi/L MCL. An investigation into the source of the contamination revealed that the tritium and sodium-22 originated from activated soil shielding located adjacent to the g-2 target building. Rainwater was able to infiltrate the activated soils and carry the tritium and sodium-22 into the groundwater. To prevent additional rainwater infiltration into the activated soil shielding, a concrete cap was constructed over the soil shielding in December 1999.

Following the concurrence of the NYSDEC, a Record of Decision (ROD) was signed by the U.S. DOE and U.S. EPA in early 2007. This ROD requires continued routine inspection and maintenance of the impermeable cap, groundwater monitoring of the source area to verify the continued effectiveness of the storm water controls and monitoring the tritium plume until it attenuates to less than the 20,000 pCi/L MCL.

2.0 Monitoring Activities

Surveillance of groundwater quality is accomplished using five wells located immediately downgradient of the source area, and 10 wells located further downgradient, southeast of AGS facility Building 912. The monitoring frequency for five wells located immediately downgradient of the source area wells is semi-annual, with samples collected during the 2nd and 4th quarters of the year. The 10 wells located downgradient of Building 912 are sampled during the 4th quarter.

Source Area Monitoring Results:

During the 2nd Quarter, the maximum tritium concentration in source area monitoring wells was 3,070 pCi/L in well 054-185 (Figure 18-1). The overall reductions in tritium concentrations observed in source area monitoring wells indicate that the cap is effectively preventing rainwater infiltration into the activated soil shielding and the amount of residual tritium that is available to be flushed out of the deep vadose zone is decreasing.

3.0 Recommendations

- Continue to sample the five monitoring wells directly downgradient of the source area (near Building 912A) semiannually (2nd and 4th Quarters), and the 10 wells located near Building 912 annually (4th Quarter).
- Continue scheduled inspections and perform required maintenance of the g-2 cap.
- Monitoring results will be communicated to the regulatory agencies via quarterly and annual reports.

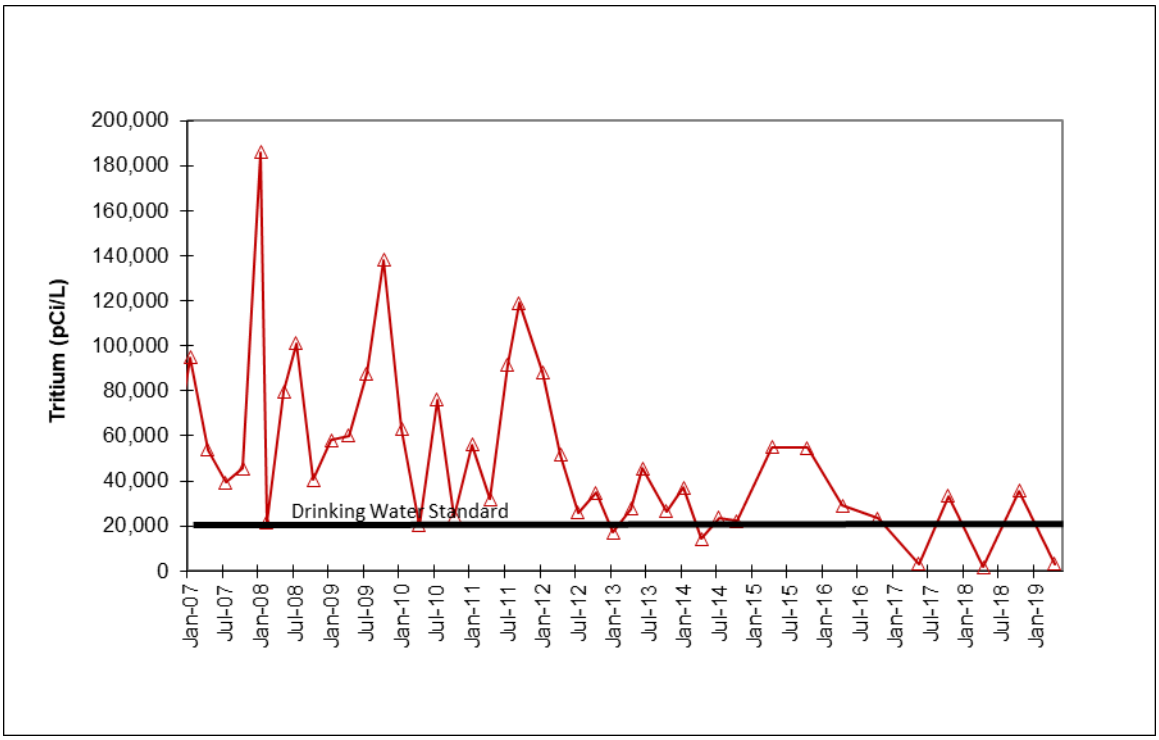


Figure 18-1. Maximum tritium concentrations observed from January 2007 through April 2019 in groundwater downgradient of the g-2 source area.

Table 18-1
g-2 Tritium Plume Monitoring Well Data
"Hits Only" - April through June 2019

Site ID : 054-07

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/19/2019	1130	317	297	PCI/L	35.00	

Site ID : 054-184

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/19/2019	1710	313	354	PCI/L	32.50	

Site ID : 054-185

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
Tritium	04/19/2019	3070	322	487	PCI/L	32.50	

Section 19

Q-2 2019 Quarterly Monitoring Summary
BLIP Source Area

1.0 Background

The Brookhaven Linac Isotope Producer (BLIP) is an active accelerator facility located in the central portion of the site. The BLIP facility has been in operation since 1972 and is a national resource for producing the radioisotopes that are crucial in nuclear medicine for both research and clinical use. BLIP also supports BNL's research on diagnostic and therapeutic radiopharmaceuticals.

Beam line operations have resulted in the activation of soils that surround the BLIP target vessel. These activated soils are approximately 30 feet below the BLIP building, in a small zone surrounding the target vessel. In 1998, low levels of tritium were detected in the groundwater near the BLIP facility experiment at concentrations of approximately three times the 20,000 pCi/L MCL. Sodium-22 was also detected in the groundwater, but the levels were less than the 400 pCi/L MCL. A number of corrective actions were implemented in 1998 to prevent additional rainwater from entering the activated soil. These included repairing and reconfiguring the building's roof gutters and downspouts, resealing the paved areas south of the building, and installing a concrete cap in the remaining areas around the building. In 2000, a colloidal silica grout was injected into the activated soil to further immobilize the tritium and sodium-22, and in 2004 an additional impermeable cap was constructed over the beam line that runs from the Linac to the BLIP facility.

Following the concurrence of the NYSDEC, a Record of Decision (ROD) was signed by the U.S. DOE and U.S. EPA in early 2007. This ROD requires continued routine inspection and maintenance of the impermeable cap and groundwater monitoring to verify the continued effectiveness of the storm water controls.

2.0 Monitoring Activities

Three groundwater monitoring wells are positioned immediately downgradient of the BLIP facility. The wells are currently monitored on a semi-annual basis (during the 2nd and 4th Quarters).

Monitoring Results:

During the 2nd Quarter sample period, tritium was detected in downgradient well 064-48 at a concentration of 5,000 pCi/L. Since early 2006, tritium concentrations in the groundwater downgradient of BLIP have been continually less than the 20,000 pCi/L MCL (Figure 19-1). The overall reductions in tritium concentrations observed in the source area wells since 2006 indicate that the cap is effectively preventing rainwater infiltration into the activated soil shielding and the amount of residual tritium that is available to be flushed out of the deep vadose zone is decreasing.

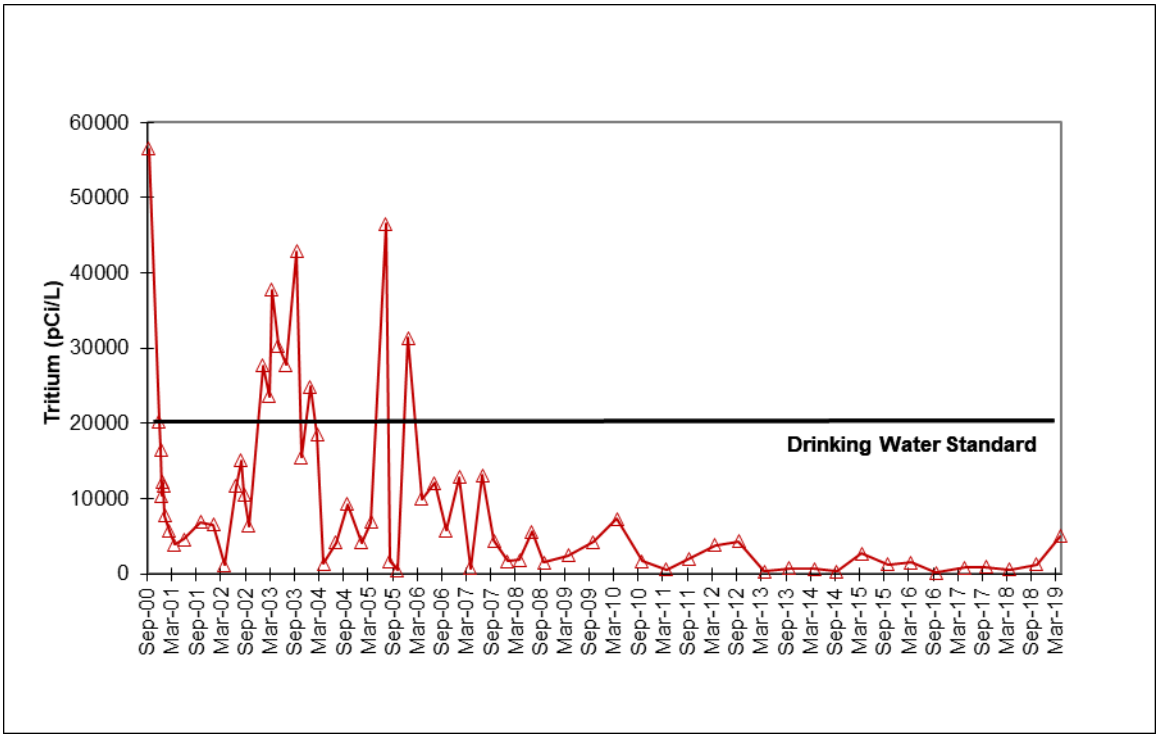


Figure 19-1. Maximum tritium concentrations observed from 2000 through April 2019 in groundwater immediately downgradient of the BLIP Facility.

3.0 Recommendations

The following are recommendations for the BLIP facility:

- Continue monitoring the three wells immediately downgradient of BLIP for tritium on a semiannual basis (2nd and 4th Quarters).
- Continue scheduled inspections and perform required maintenance of the BLIP cap.
- Monitoring results will continue to be communicated to the regulatory agencies via quarterly and annual reports.

Section 20
Q2-2019 Operations Summary
OU III Building 452 Freon-11 Pump & Treat System

Process: Groundwater extraction and air stripping treatment, with discharge to a drainage culvert leading to Recharge Basin HS.

Goal: Remediation of Freon-11 in the groundwater and reach Maximum Contaminant Levels (MCLs) in core monitoring wells within 30 years for the Upper Glacial aquifer (by 2030).

Start Date: March 2012

Table 20-1
OU III Building 452 Freon-11 Pump & Treat System
Pumping Rate (gpm)

Extraction Well	**EW-18**
Site Id #	095-316
Screened Interval (feet below grade)	55-65
Desired Flow Rate (GPM)	0**
April	0**
May	0**
June	0**
Actual (Avg. over Qtr.)	0**

* System began pulsed pumping in February 2015 (one month on and one month off).
**System placed in stand-by mode March 2016 and was temporarily re-started November 2016 through March 2017 due to a rebound in Freon-11 concentrations in EW-18.

Figure 20-1
OU III Building 452 Freon-11 Pump & Treat System
Cumulative Mass Removal of Trichlorofluoromethane vs. Time

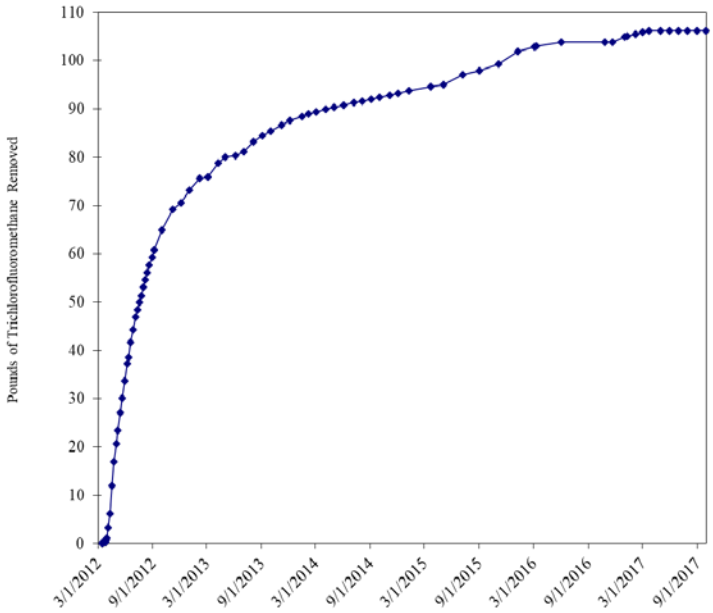


Figure 20-2
OU III Building 452 Freon-11 Pump & Treat System
Influent Trichlorofluoromethane Concentrations vs. Time

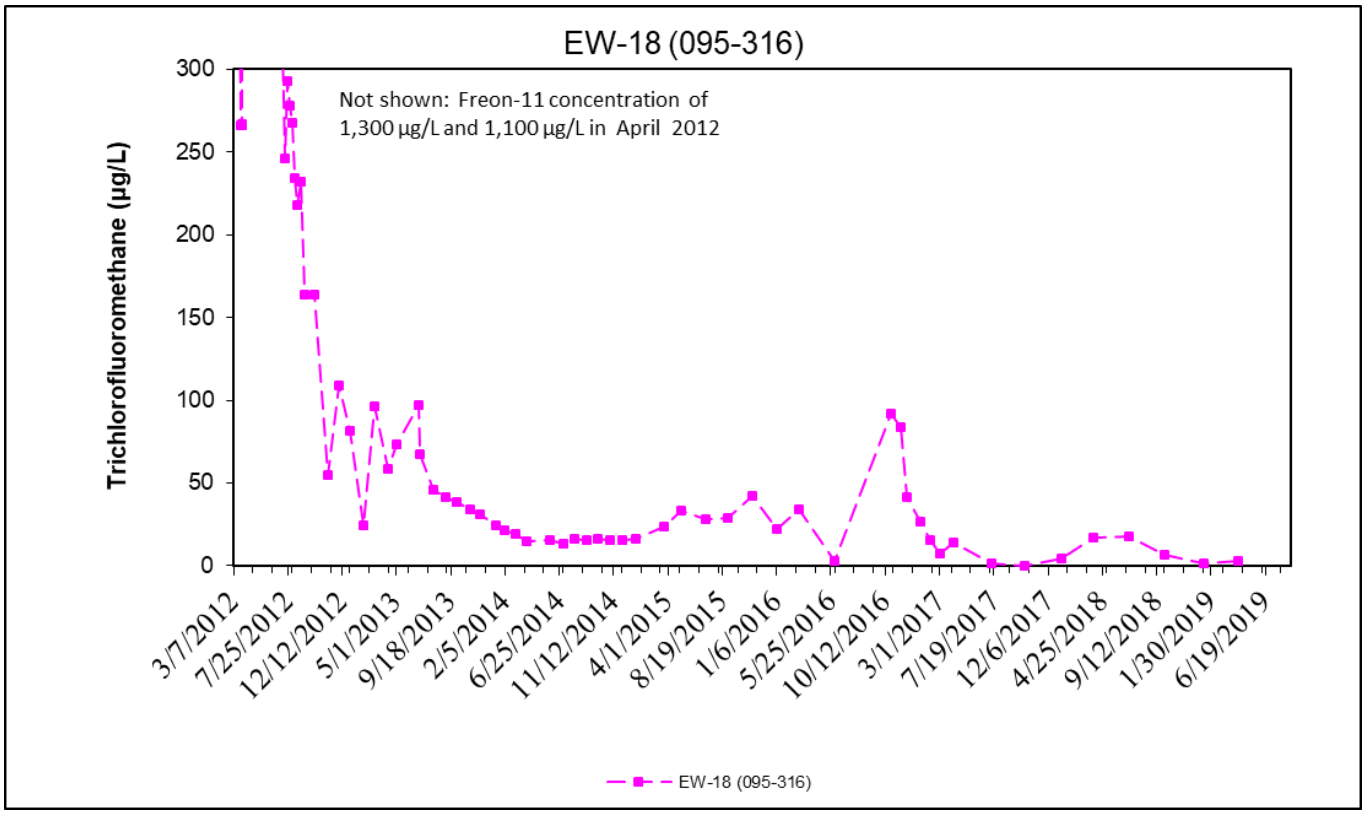


Table 20-2
Effluent Water Quality
SPDES Equivalency Permit Concentrations April 1, 2019 – June 30, 2019

Parameter	Permit Limit	Max. Measured Value	Units	Frequency*
Flow	**120**	**NA**	**GPM**	**Continuous**
pH (range)	**5.0 - 8.5**	**NA**	**SU**	**Weekly**
Benzene	**1.0**	**NA**	**ug/L**	**Monthly**
Bromodichloromethane	**50**	**NA**	**ug/L**	**Monthly**
Carbon Tetrachloride	**5.0**	**NA**	**ug/L**	**Monthly**
Chloroform	**7.0**	**NA**	**ug/L**	**Monthly**
Dichlorodifluoromethane	**5.0**	**NA**	**ug/L**	**Monthly**
1,1-Dichloroethylene	**5.0**	**NA**	**ug/L**	**Monthly**
4-Isopropyltoluene	**5.0**	**NA**	**ug/L**	**Monthly**
Methyl Chloride	**5.0**	**NA**	**ug/L**	**Monthly**
Methylene Chloride	**5.0**	**NA**	**ug/L**	**Monthly**
Tetrachloroethylene	**5.0**	**NA**	**ug/L**	**Monthly**
Toluene	**5.0**	**NA**	**ug/L**	**Monthly**
1,2,3-Trichlorobenzene	**5.0**	**NA**	**ug/L**	**Monthly**
1,1,1-Trichloroethane	**5.0**	**NA**	**ug/L**	**Monthly**
Trichlorofluoromethane	**5.0**	**NA**	**ug/L**	**Monthly**
1,2,4-Trimethylbenzene	**5.0**	**NA**	**ug/L**	**Monthly**
Xylene (meta + para)	**10.0**	**NA**	**ug/L**	**Monthly**

NA= The system is in stand-by mode.

System Operations

April 2019:

The system remained in stand-by mode.

May 2019:

The system remained in stand-by mode.

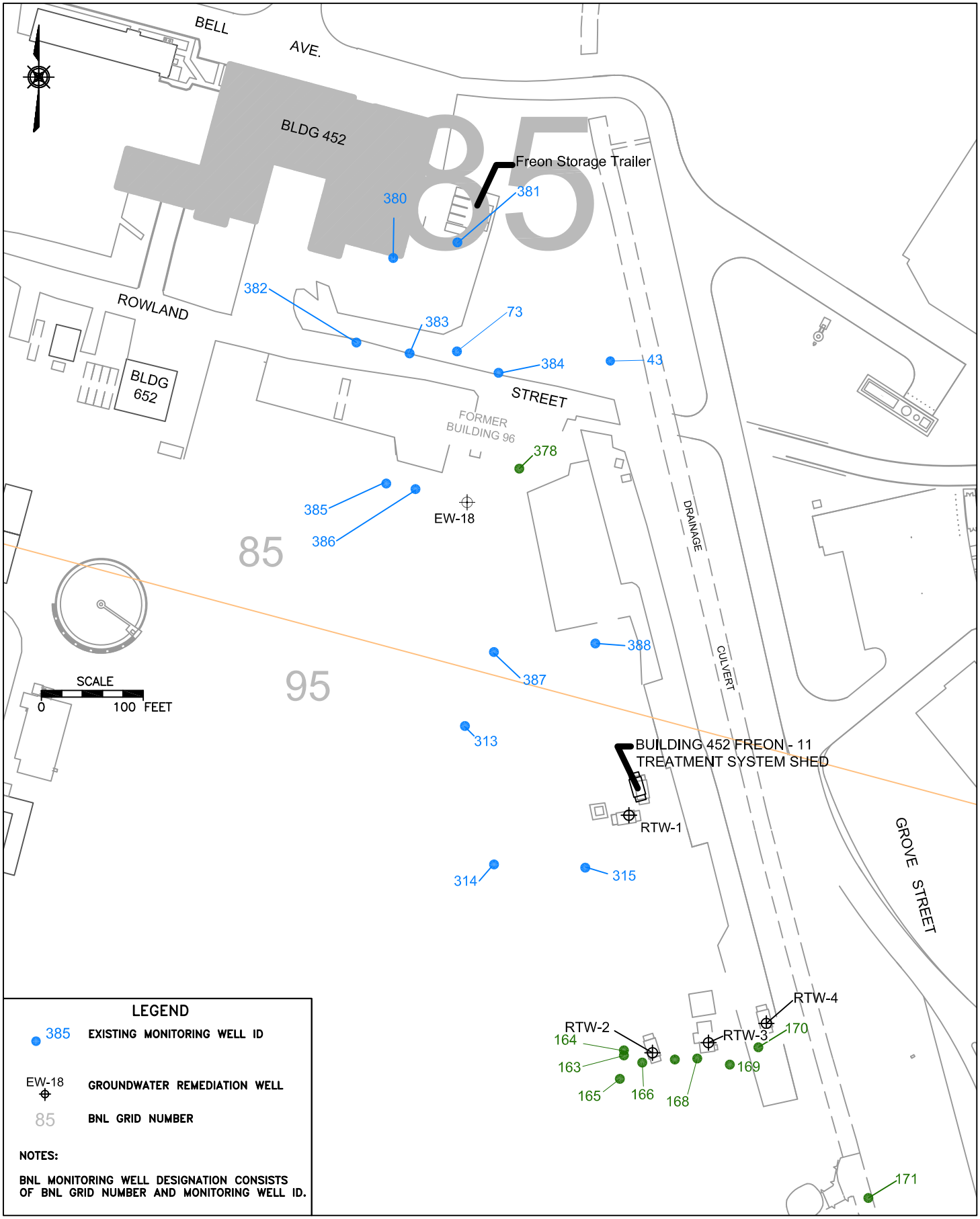
June 2019:

The system remained in stand-by mode.

In June, the Freon-11 tray air stripper was repurposed to treat the water extracted from Building 96 extraction well RTW-1.

Planned Operational Changes

- Maintain the Building 452 Treatment System in standby mode. As the system has met its cleanup goals, submit a Petition for Closure to the regulators in July 2019.
- Maintain full-time operation of the Building 96 treatment well RTW-1. Beginning with the July discharge monitoring report, the RTW-1 discharge will be reported under the Freon-11 equivalency permit.
- During the second quarter of 2019, Freon-11 concentrations in extraction well EW-18 were below the NYS AWQS of 5 µg/L. The monitoring wells were not scheduled to be sampled in the second quarter.
- Following regulatory agency approval of the Petition for Closure, discontinue the Building 452 monitoring program. Select monitoring wells located downgradient of extraction well EW-18 may be incorporated into the Building 96 program. Any decisions to abandon extraction well EW-18 and the monitoring wells will be made after the PFAS plume originating from the former firehouse area has been fully characterized.



BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL PROTECTION DIVISION

TITLE:

BUILDING 452 AREA FREON-11 MONITORING WELL NETWORK

SITEWIDE REMEDIATION SYSTEMS
SECOND QUARTER 2019 OPERATIONS REPORT

DWN:	VT: HZ.:	DATE:	PROJECT NO.:
AJZ	–	08/24/12	
CHKD:	APPD:	REV.:	NOTES:
JEB	RH	08/22/19	RH Rev

FIGURE NO.: 20-3

Table 20-3
OU III Freon Influent Data
"Hits Only" - April through June 2019

Site ID : 095-316 (EW-18)

Chemical Name	Sample Date	Value	Det. Limit	Error	Units	Depth	Qual
524.2 TVOC	04/09/2019	4.45	--	--	UG/L	0.00	
524.2 TVOC	04/09/2019	4.45	--	--	UG/L	0.00	
Chloroform	04/09/2019	1.15	0.5	--	UG/L	0.00	
Chloroform	04/09/2019	1.15	0.5	--	UG/L	0.00	
Tetrachloroethylene	04/09/2019	0.25	0.5	--	UG/L	0.00	J
Tetrachloroethylene	04/09/2019	0.25	0.5	--	UG/L	0.00	J
Trichlorofluoromethane	04/09/2019	3.05	0.5	--	UG/L	0.00	
Trichlorofluoromethane	04/09/2019	3.05	0.5	--	UG/L	0.00	

Qualifiers :
J = Estimated value.
D = Compound was identified in an analysis at a secondary dilution factor.